The incentive effects of performance measures and target setting

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Proefschrift

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Chapter 1: Introduction

1.1. Background

This thesis intends to contribute by examining to what extent choices that firms make regarding their incentive compensation design (i.e. choice of performance measures, choice of performance targets, and the choice of incentive intensity) are informed by agency theory. The dominant approach to executive compensation design within the field of financial economics is typically the 'optimal contracting approach' (Bebchuck et al., 2002; Core et al., 2005). Here, executive compensation is designed in order to minimize agency costs (i.e. the sum of contracting costs, monitoring costs, and costs due to residual divergence of interests) that arise due to the separation of ownership and control. Moreover, the executive compensation plan should induce executives to take and retain the position (i.e. meet or exceed executives' opportunity cost) and provide incentives for executives to expend effort and select actions best aligned with shareholders' interest. The optimal or efficient contract is the contract that maximizes the net expected economic value for shareholders after agency costs (e.g. payment to employees) (Core et al., 2005). Overall, the board is viewed as serving shareholders' interests with the executive compensation scheme designed to serve this objective.

The bonus payment of about $200 million to executives of the financial products division, which were heavily involved in the record-breaking loss of $62 billion for the American International Group Inc. in the fourth quarter of 2008, contributed to the currently popular perception of executives receiving excessive pay only loosely related with performance.[1] (Wall Street Journal, 2009). The provision of excessive compensation tenuously related with prior performance is explained by Bebchuck et al. (2002) and Bebchuck & Fried (2003; 2004) through a managerial power approach. Boards, rather than acting perfectly in the interests of shareholders, are captured by executives, while the reputational concerns of directors and market forces such as product markets or the market for corporate control[2] are not sufficiently powerful to

[1] The attention that these payments received from both the press and politicians was further motivated by the government bailout of $170 billion that American International Group Inc. recently received.

[2] Redistribution of profits from shareholders to executives has no significant impact on the operational efficiency of firms, appropriation of rents has a non-significant impact on firm value which only results in a non-significant increase in takeover risk and losses incurred after removal from office are limited because of 'golden parachutes', future prospects on the managerial labor market relies more on current

constrain the bargaining power of the agent (Bebchuck et al., 2002; Bebchuck & Fried, 2003; 2004; Weisbach, 2007). The primary constraints on executive compensation are the upper bounds determined by public perceptions (defined as 'outrage costs').[3] Bebchuk et al. (2002) and Bebchuck & Fried (2003; 2004) speak about 'camouflage' as the propensity of managers to minimize the 'outrage costs' by means of obscuring and legitimizing their extraction of rents.[4]

Bebchuk et al. (2002) and Bebchuck & Fried (2004) consider the widespread use of incentive packages that do not filter out factors that affect performance beyond the manager's control as an illustration of suboptimal compensation that originates from the influence that executives exert on the executive compensation design.[5] In this respect, Bebchuck et al. (2002) and Bebchuck & Fried (2004) refer to the prevalence of option plans that enable managers to reap benefits from performance increases due to industry or market trends (windfalls) instead of the use of indexed and/or performance-vested stock options. Bertrand & Mullainathan (2001) show that executive compensation responds to movements in oil prices, changes in industry-specific exchange rates for firms in the traded goods sector, and year-to-year differences in mean industry performance. Moreover, they find that compensation is as sensitive to a lucky dollar (where luck is defined as changes in firm performance beyond the CEO's control) as to a general dollar. Garvey & Milbourn (2006) show that performance benchmarks are used asymmetrically in executive compensation, i.e. executives are rewarded for good luck, but are to some extent insulated from bad luck.[6] Moreover, Bebchuck & Fried (2003; 2004) predict that managers will extract more rents in situations and structures in which they have more power. Consistent with this, Bertrand & Mullainathan (2001) document that better governed firms pay

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firm performance than rents extracted, and rent extraction is unlikely to impede the firm's access to equity capital, but only slightly raise the cost of equity (Bebchuck & Fried, 2003; 2004).

[3] Core et al. (2008) find no evidence of executive compensation decreasing following negative press coverage.

[4] Rents are defines as the excess compensation executives are able to extract because of their positional power relative to what executives would have received under a contract maximizing shareholder value.

[5] Hall & Liebman (1998) refer to the near complete absence of such mechanisms as a puzzle while for Abowd & Kaplan (1999) it represents an open question why executives are rewarded for doing nothing more than riding waves of strong bull markets. However, Murphy (2002) argues that the likelihood of a given stock to earn returns in excess of an index is far lower relative to likelihood of a non-indexed option to expire in the money, imposing more instead of less risk on the risk-averse recipients. Core et al., (2005) decompose the firm's return in a market return (R_{market}) and a firm-specific return (R_{firm} - R_{market}) where the market component reflects pay, not incentives.

[6] Likewise, Bebchuck & Fried (2002) refer to firms lowering the strike price of stock options when the stock price falls below the original exercise price, but firms rarely raise strike prices in rising markets.

less for luck. Garvey & Milbourn (2006) report that the asymmetry in the response of compensation to good versus bad luck is stronger when corporate governance is weaker. Core et al. (1999) show that CEO compensation is greater when corporate governance is less effective. Moreover, this excess pay is negatively associated with subsequent firm operating and market performance.

Overall, Bebchuck et al. (2002; 2004) believe that the managerial power perspective provides a superior explanation for patterns and practices of executive compensation relative to an optimal contracting perspective. However, optimal incentive contracting and managerial rents are not mutually incompatible in the sense that evidence of managerial power exerted does not rule out optimal contract design (Murphy, 2002; Weisbach, 2007). More particularly, in many settings where managerial power exists, contracts can anticipate and try to minimize these costs and therefore may in fact be written optimally (Core et al., 2005).[7] Evidence of managerial power thus does not rule out the possibility that firms contract optimally. Only to the extent that excess pay following from the exertion of managerial power is associated with poor performance (as for example documented by Core et al., 1999), one provides evidence of managerial power beyond optimal contracting (Core et al., 2005).

1.2 Outline

This thesis consists of three empirical essays. Overall, this thesis aims to gain further understanding of the extent to which agency theory can help to explain specific patterns and practices of compensation design. This enables management accounting researchers to acquire deeper insight into the potential and boundaries of agency theory, and therefore to more accurately disentangle agency theory from managerial power as alternative, though not necessarily competing, explanations for management accounting phenomena.

At this point, I will briefly discuss the main findings of the three essays.

My first essay is entitled *The interplay between target setting and performance evaluation*. First, this study examines the information that the firm incorporates in setting sales targets for their store managers. The firm employs an incentive system

[7] An optimal or efficient contract refers to a contract that maximizes the net expected economic value for residual claimants after transaction costs (e.g. contracting costs) and payment to agents given the contract environment. Optimality does not imply first-best efficiency.

composed of quarterly bonus awards, contingent on sales target deviations, and an annual salary increase, contingent on subjective appraisal scores. The subjective appraisal scores convey information about the ability of store managers to comply with prescribed directives. The firm sets next-period sales target based on the sales target deviation in the current period (i.e. target ratcheting). It is documented that the firm ratchet targets in an asymmetric fashion, i.e. positive sales target deviations lead to a greater positive target update compared to the negative target update following negative sales target deviations. Moreover, I document that both current sales target deviations and information from subjective performance appraisals are used to set next-period sales targets. This enables the firm to set manager-specific sales targets, i.e. targets that are equally challenging for each manager in his or her own right. So, more or less equal incentives are imposed on all managers. The subjective appraisal scores are consistent with the sales potential of managers, i.e. appraisals contain information about the potential of each manager to improve performance given their past performance. The incentive system thus provides incentives to managers to achieve the current sales target (bonus) and to consider future performance (compliance with directives). Finally, prior literature identified the ratchet effect (i.e. managers trade-off present gains against future losses from the assignment of higher targets) as an adverse effect of ratcheting. Despite limited leeway for managers to slow down performance (e.g. managers cannot tamper with accruals), I still find that managers who document a favorable intermediate performance slow down performance in the final months of the year.

My second essay is entitled *Managerial horizon and the choice for insiders versus outsiders: evidence of compensation structures of CEO successors*. Here it is argued that outside CEO successors have a shorter manager horizon relative to inside CEO successors because of their greater outside employment opportunities (due to their more diversified human capital) and their tendency to quickly show results in an attempt to swiftly build reputation within their new firm. I examine, following contracting theory, to what extent firms use incentive compensation features to account for the potential distortion in the intertemporal decision-making with respect to the type of CEO succession (with efficient investment as benchmark). The results suggest that firms account for the horizon of CEO successors such that outside CEOs are subject to incentives that redirect attention to the long-term impact of their decisions. More specifically, firms aim to lengthen the horizon of these managers by

de-emphasizing bonuses (contingent on current earnings) while emphasizing long-term compensation (contingent on future earnings and/or stock price) in the respective CEO incentive plans.

My third essay is entitled *Relative weights on nonfinancial performance measures and the incentive intensity of CEO bonus contracts: disentangling simultaneous cause-and-effect relations*. This paper investigates the assertion from contracting theory that companies optimally provide weak incentives if they lack undistorted performance measures. Firms add nonfinancial measures to their CEO bonus contracts when a sole reliance on financial measures would not be informative about the managerial effort. However, the inclusion of nonfinancial measures in the CEO bonus contract may possibly contribute little to the congruence of the overall performance measure due to the difficulty of adequately weighting the multiple financial and nonfinancial measures (e.g. due to the complex and ambiguous relation between nonfinancial measures and financial outcomes). Hence, this paper examines whether the potentially distortional nature of a bonus contract composed of both financial and nonfinancial measures prompt firms to decrease incentives provided through the bonus contract, or alternatively, whether firms wishing to provide stronger incentives decrease the relative weight of nonfinancial measures in the bonus contract. I find that firms that seek to provide strong incentives decrease the relative weight of nonfinancial measures in CEO bonus contracts. This coincides with prior literature that suggests that firms adjust for items in their reported earnings to improve their financial summary performance measure.

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Chapter 2: The interplay between target setting and performance evaluation[8]

2.1 Introduction

This paper documents the target-updating process and the managers' responses to this process for retail store managers over 4 successive accounting years. I find that the firm uses sales information and information from subjective performance appraisals to set next-period sales targets. I demonstrate that subjective performance appraisal outcomes are informative of future sales performance. I also find that target ratcheting leads managers to slow down their effort.

Performance appraisals are essentially subjective in the firm I study. That is, there is no explicit target that determines performance appraisal outcome. The incentive literature maintains that subjective performance appraisal entails lenient and compressed performance ratings (e.g., Prendergast, 1999; Moers, 2005). This firm requires supervisors to apply a forced distribution of 'good', 'mediocre' and 'bad' in establishing performance appraisals. This feature provides us with a setting that controls for possible lenient and/or compressed performance appraisals. The evidence suggests that subjective assessments of managerial performance (e.g. the extent to which managers provide timely performance-feedback to their employees) are used for target setting. That is, the firm combines prior sales information with subjective performance information to set sales targets. I also demonstrate that the subjective performance appraisal outcomes are associated with future sales performance. The analysis regarding subjective appraisals allows us to extend our understanding of Hayes and Schaefer (2000) who find a relation between current cash compensation and future performance.

Indjejikian and Nanda (2002) point out that targets should contain all available information and that subsequent target deviations should not be correlated. However, in their sample they find evidence of serial correlation. Contrary to Indjejikian and Nanda (2002), I find no serial correlation between consecutive target deviations. I argue and demonstrate that this is because of target setting accuracy. The ability of managers to comply with prescribed directives aimed at increasing future sales levels

[8] This chapter is based on a working paper co-authored with Jan Bouwens (Tilburg University).

is observed through the subjective performance appraisals. This approach enables the firm to set challenging manager-specific targets (Leone et al., 2004). Consistent with Indjejikian and Nanda (2002) and Merchant and Manzoni (1989), the performance appraisals are correlated over time. I argue that this is because the future sales potential of managers is conveyed through the appraisals. Overall, the evidence suggests that all available information is impounded in the sales targets, motivating managers to exceed past sales performance in the current period. Moreover, the subjective performance appraisals motivate managers to take measures in the current period that affect next-period financial performance. To my knowledge, the use of subjective appraisals to enhance target accuracy has not been documented in the literature before. I also believe that the distinct functions of bonus-determining targets (improve this year's financial performance) and performance appraisals (increase next-period financial performance) have not been documented before.

The managers in this firm acquire a bonus if they exceed their sales target. Next-period sales targets are informed by past sales performance. The accounting literature has emphasized that target ratcheting leads managers to manipulate (measured) outcomes in order to mitigate the size of positive target updates (Leone and Rock, 2002; Murphy, 2001). I study this phenomenon in a context where firm management makes it virtually impossible to manipulate measured outcomes, to find that managers resort to real activity manipulation (e.g. Roychowdhury, 2006; Eldenburg et al., 2007). While managers can influence performance through price discounts, cutting back on expenditures (Roychowdhury, 2006), or through investment reductions (Eldenburg et al., 2007), here managers resort to effort reduction to impede target updating. Moreover, the access to monthly data enables me to ex-ante identify which particular manager has an interest in manipulating results. Prior research has identified ex-post conditions in which managers of a certain firm or unit may have benefited from result manipulation (e.g. Roychowdhury, 2006). Here, monthly sales target and target achievement data is collected to establish ex-ante whether managers have incentives for, and establish ex-post whether managers have actually engaged in, result manipulation.

The remainder of the paper is structured as follows. The next section describes the research setting and the firm's theory on motivating store managers. Then I proceed to

discuss my observations of the target updating process that the firm deploys. The subsequent section describes how managers respond to the target-setting process. I then discuss the results and end with some concluding remarks.

2.2 Research setting

2.2.1 The firm and its stores

The research site is a business unit of a Netherlands-based privately held retail firm under the name of Free Record Shop. They sell games, CDs, DVDs and a range of goods and services associated with entertainment. The firm's strategy is to maintain its market leadership within the Netherlands and also to strengthen its position as one of the major retailers in their branch in North-West Europe. In 2005 the firm ran about 400 retail stores, employed 2500 people, and generated €400 million revenues. The business I study represents the firm's main shop formula located in the Netherlands. The business unit comprises three geographical regions, and each region consists of a few clusters that each contain seven to nine stores. The empirical analyses in this study are based on nearly 200 retail stores that account for about 50% of total firm sales. Most retail stores are located in or near shopping centres, mostly in urban areas, and each outlet sells more or less the same merchandise. The firm's accounting year differs from the calendar year and starts in October and ends in September.

2.2.2 The target-setting process

Sales play an important role in the firm's target setting process. Targets are set on an annual basis, with the targets for the consecutive year set at the end of the prior accounting year. The overall sales target for the business unit is established on the basis of the actual sales and the financial goals for the coming period. The overall sales target is subsequently allocated over regions, clusters, and stores in a top-down fashion. To enable close monitoring of store managers, the yearly sales target for each store is broken down into monthly sales targets. In this breakdown, the firm adjusts for seasonal patterns in sales (e.g. a busy Christmas season). This seasonal pattern is considered to be uniform across retail stores given that stores face similar economic conditions and have similar product lines.[9] Senior management believes that this

[9] In order to test the assertion of uniformity of seasonal patterns across stores, I regress actual sales in the current month on actual sales in the previous month for each store while including year dummies and adjusting for clustered standard errors. The results substantiate the intuition provided by senior management regarding the homogeneity of seasonal patterns across stores. For instance, retail stores

target-setting process produces more or less equally accurate sales targets for all months.[10] Finally, the sales target for each retail store serves as input for the budgeted number of labor hours

2.2.3 The firm's incentive system

The firm's incentive system is primarily based on two components. First, a quarterly bonus is awarded to store managers that is increasing in their sales performance and decreasing in their employment of labor hours. The bonus is a linear function of positive sales target deviations calculated by comparing actual sales and target sales aggregated over the respective three months. The quarterly bonus payout is reduced linearly by the amount that store managers exceed their quarterly labor hours budget, with a lower bound of zero bonus payout. Meeting the labor budget as such does not make a store manager eligible for variable pay.[11] Under the quarterly bonus payout schedule, managers may therefore receive bonuses from 0 to 4 quarters. On average 10 percent of a store manager's total pay originates from bonus payouts. Second, store managers are eligible for a yearly salary rise. Managers' supervisors base this decision on the subjective performance appraisal conducted annually at the end of the accounting year. The appraisal score consists of two equally-weighted dimensions: i) the manager's performance in terms of sales and use of labor hours; and ii) the manager's compliance with directives (e.g. the extent to which store managers support sales assistants in solving day-to-day problems).[12] Supervisors award managers with an A if they comply in excellent fashion with firm directives, while a B and a C represent sufficient and insufficient compliance with directives, respectively. The supervisor also ranks the manager's performance in terms of sales and use of labor hours on a scale from 1 to 3, where 1 denotes an excellent performance. Supervisors

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experience a busy Christmas season reflected by a 1.44 increase in sales in December relative to November with a corresponding t-statistic of 31.75. The 12 regressions of current monthly sales on prior monthly sales yield a mean (median) t-statistic of 64.51 (50.17) (not tabulated).

[10] I test the assertion whether target accuracy systematically varies between months by computing monthly target deviations defined as the absolute value of the difference between actual monthly sales and the monthly sales target divided by the monthly sales target. Next, one-sided paired t-tests are performed for each of the 12 individual months to determine whether the mean-difference between the target accuracy for each individual month and the average target accuracy of the remaining 11 months is significantly smaller than zero. The results do not reveal significantly lower target accuracy for the majority of the individual months.

[11] Bonuses are paid according to the following formula: if sales – sales target > 0; €46 * [(quarter sales – sales target) / sales target] + 1% * (quarter sales – sales target). The bonus is discounted for labor hour overruns: -22 Euro * (actual hours – budgeted hours) / budgeted hours. It is not permitted to deviate from this formula.

[12] A complete list of directives is reproduced in Appendix 1.

are forced to distribute their evaluations over the A1-C3 categories. The overall appraisal outcome determines the salary increase.

2.2.4 The theory firm managers apply and the tests

Top management assumes that stores on average perform 20% below sales capacity. The firm's CFO stated this assumption as follows.[13]

> *"On average all stores are working at 80% of capacity. Therefore it is difficult for me to accept any sales drop."*

In addition, firm management believes that sales capacity increases each year with the introduction of new products. Consequently, the 20% slack would increase each year if store managers fail to increase sales. Firm management explicitly communicated that past sales performance plays an important role in the target setting process. This is consistent with economics literature that identifies three sources for target setting: past performance, technical study, and peer reviews (Murphy, 2001).

The firm believes that exclusively providing (bonus) incentives through the sales performance measure may result in hard-selling (Thevaranjan et al., 2000), which could subsequently decrease customer satisfaction and future sales levels. The firm therefore maintains strong opinions on how to improve sales performance and translates these opinions into directives. For example, the firm emphasizes customer satisfaction, but acknowledges that merely rewarding customer satisfaction may not contribute to firm value, since there are simply too many ways to increase customer satisfaction without increasing profits (Baker, 2002; Dikolli & Sedatole, 2007). The firm is convinced, for instance, that without managers providing timely performance feedback to sales assistants, sales levels and customer satisfaction levels are bound to deteriorate. Hence, providing feedback to assistants is a directive imposed on the store manager. While all directives are equal for each store manager in wording, it is up to the supervisor to decide on the extent to which each store manager complies with the directives. Merchant (1985) argues that prescribed behaviour is called for if the store manager is unaware or unwilling to ascertain how to affect firm performance. For this

[13] The results of my quantitative analyses are supported by qualitative information from interviews with senior management and an investigation of internal documents. Interview transcripts are approved. At three different stages during the analysis and write-up of the paper, the interpretation of the results has been discussed with, and approved by, senior management.

reason supervisors visit stores to ascertain that store managers actually comply with the directives. Thus, compliance with the prescribed directives is part of the annual subjective performance appraisal. This is consistent with literature that suggests that such measures are indicators of current and future performance (Hauser et al., 1994; Ittner et al., 1997; Ittner and Larcker 1998; Banker et al., 2000; Sedatole, 2003; Bryant et al., 2004; Ittner and Larcker 2005; Abernethy et al., 2008) and as such can improve contracting efficiency and motivate managers to undertake value-creating actions. Compliance with directives and the performance in terms of sales and use of labor hours each account for 50% of the overall subjective performance assessment.

Consistent with findings of Leone et al. (2004), firm management maintains that targets should challenge each store manager individually. I investigate whether targets are geared to challenge specific managers and what comprises a challenging performance target. While the economics literature more or less ignores manager-specific target levels, goal-setting literature has established a large body of research that is primarily based on experiments (see Locke & Latham, 2002 for an excellent review of this literature). The main thrust of this literature is that managers are best motivated with targets that are challenging, meaning that managers qualify these targets as difficult but attainable (Fisher et al., 2003). However, the empirical evidence of Indjejikian and Nanda (2002) and Merchant and Manzoni (1989) suggests that targets are highly attainable in that managers attaining the current target are also likely to exceed the next period target. Both the goal-setting and the economic literature pay little attention to how management actually establishes the target at firm level. The literature has been particularly mute on what the information sources for target setting are. As the firm performs annual subjective appraisals partly contingent on the ability of store managers to comply with directives, I examine whether this information is incorporated during the target setting process. During the interviews, firm management was able to point out very good and poor performers. They asserted that in many cases store managers retained their relative position vis-à-vis their colleagues in terms of the performance appraisal and bonus. I test whether the control system in place produces the expected results, i.e. I evaluate whether current compliance with directives is associated with future sales. This would be consistent with Hayes and Schaefer (2000), who found that bonuses that have no association with current performance are predictive of future performance.

2.2.5 Data collection and descriptive statistics

I collected monthly sales data and quarterly labor hour data over a period of 58 months (16 quarters) starting from October 2000. Sales and labor hours data were electronically obtained from corporate headquarters' general ledgers. Each year consists of 200 individual store observations, with 12 observations excluded in each year because operations were discontinued. I omitted incomplete observations from the sample (e.g. 10 monthly observations for actual sales and 12 monthly observations for target sales). I manually collected staffing data from HR-records from October 2001 to March 2005. I excluded observations of retail stores featuring more than one manager within an accounting year. I collected manager's performance appraisals spanning three years, i.e. October 2001 to September 2004. Only retail store managers operating for a full year receive a subjective performance appraisal. Documents regarding general strategy, incentive compensation and performance evaluation and meetings with senior management and corporate staff provide qualitative data about research issues.[14] Descriptive statistics on the main variables are presented in Table 1.

In terms of store managers' performance, the mean (median) sales target deviation is about zero (€5K), while 46% of the managers report a negative sales target deviation. The mean (median) sales target update is €54K (€52K), while in 17% of the cases the sales target is adjusted downward consistent with the assumption that on average retail stores exhibit slack. In addition, compared to last year the mean (median) sales change is €51K (€45K), while 16% of managers show negative sales changes. The vast majority of the store managers (70%) do not exceed constraints with respect to the maximum number of labor hours. The average negative labor hours target deviation amounts to 218 hours. The majority of the managers have a bonus payout (78%). The bonus is paid out on a quarterly basis. 20%, 17%, 20% and 21% of the managers earn a bonus over 4, 3, 2 and 1 quarter(s) respectively (not tabulated). The mean bonus payout is about 10% of managers' wages, while the mean career-specific salary increase equals 2% of managers' wages. Finally, the fraction of managers who receive a bonus decreases throughout the year from 58% in the first quarter, 50% in the second quarter, 48% in the third quarter, and the strongest decline in the fourth and final quarter (i.e. 35% of positive bonus payouts) (not tabulated).

[14] We could only inspect these documents at the research site.

Table 1: Descriptive statistics

Sales target deviation denotes the actual sales minus target sales, % store managers with negative sales target deviation denotes the fraction of store managers with a sales target deviation < 0, sales target update denotes the sales target in period t+1 minus sales target in period t, % store managers with negative sales target update denotes the fraction of store managers with a sales target update < 0, sales change denotes the actual sales in period t minus actual sales in period t-1, % store managers with negative sales change denotes the fraction of store managers with a sales change < 0, labor hours target deviation denotes the actual labor hours minus target labor hours, % store managers who exceed maximum labor hours denotes the fraction of store managers with a labor hours target deviation > 0, bonus payout denotes the fraction of managers with bonus > 0, bonus as percentage of wage denotes the mean bonus expressed as percentage of yearly wage (excl. bonus), and salary rise denotes the career specific increase in salary.

Measure	Mean	Median	Std.dev.	Min	Max
Target sales (€)	844968	760000	398835	183120	3565980
Actual sales (€)	844939	763731	394689	226890	3000000
Target labor hours	5925	5415	1800	2879	16466
Actual labor hours	5712	5146	1886	3378	16358
Sales target deviation (€)	-29	5127	96956	-707769	565980
% Store managers with negative sales target deviation	46	--	--	--	--
Sales target update (€)	54212	52000	113059	-430071	1500000
% Store managers with negative sales target update	17	--	--	--	--
Sales change	51296	45132	114079	-713241	1601860
% Store managers with negative sales change	16	--	--	--	--
Labor hours target deviation	-218	-223	676	-2611	5560
% Store managers who exceed maximum labor hours (%)	30	--	--	--	--
Bonus payout (%)	78	--	--	--	--
Bonus (% salary)	10	7	12	0	138
Salary rise (% salary)	2	--	--	0	5

Table 2: Store managers' achievement and firm's responses

Performance appraisal scores on financial performance (vertical) and directive compliance (horizontal). Each entry provides information on the number of store managers with the respective performance appraisal score, the number of store managers with a bonus payout > 0, the mean sales target deviation defined as actual sales minus target sales, the mean sales change defined as actual sales in period t minus actual sales in period t-1, labor hours target deviation defined as actual labor hours minus target labor hours, bonus (% salary) denotes the average bonus expressed as percentage of yearly salary (excl. bonus), salary rise denotes the career specific salary increase, and sales target update denotes sales target in period t+1 minus sales target in period t. C1 and A3 appraisal scores are not awarded.

	Directive compliance score	A	B	C
Financial Score				
1	Number of obs.	23	28	0
	Bonus pay outs (%)	95%	93%	
	Sales target deviation (%)	9.71	4.74	
	Sales change (%)	14.89	10.84	
	Labor hours target deviation (%)	-6.39	-7.07	
	Bonus (% salary)	17.20	11.06	
	Salary rise (%)	5.1	3.4	
	Sales target update (%)	15.90	11	
2	Number of obs.	57	172	12
	Bonus pay outs (%)	89%	75%	50%
	Sales target deviation (%)	3.52	11.88	-9.71
	Sales change (%)	8.07	5.83	-3.42
	Labor hours target deviation (%)	-2.65	-3.40	-1.76
	Bonus (% salary)	10.46	9.30	0.83
	Salary rise (%)	3.4	1.7	0
	Sales target update (%)	10.01	8.72	-4.11
3	Number of obs.	0	23	13
	Bonus pay outs (%)		65%	54%
	Sales target deviation (%)		-1.08	-6.27
	Sales change (%)		4.27	-22.13
	Labor hours target deviation (%)		2.03	-7.99
	Bonus (% salary)		8.62	5.74
	Salary rise (%)		0	0
	Sales target update (%)		7.31	3.15

In Table 2, I summarize variable pay and performance appraisal data. It appears that in order to get a top-level appraisal on the financial dimension, it does not require managers to substantially exceed targets. While the top financial performers' deviations from sales targets are 9.71% and 4.74%, the deviations are 3.52% and 11.88% for those managers that received a mediocre score on the subjective assessment of the financial dimension. However, the sales changes are 14.89% and 10.82% respectively for the top financial performers while the sales changes are 8.07% and 5.83% for the second-ranked financial performers. Thus, sales targets that top financial performers face may be equally challenging as the targets facing the second ranked financial performers.

In Table 3, I provide further details of performance appraisals (Panel A) and target achievement (Panel B). Panel B of Table 3 shows that there is no serial correlation of target deviations over time ($\rho = 0.07$, $p<0.32$). This implies that the likelihood of store managers attaining the target is independent of past target deviations. In other words, each store manager has equal probability of attaining his specific sales target. This suggests that the firm succeeds in setting targets that are challenging for each manager in their own right. While serial correlation in target achievement is absent, subjective performance appraisals are correlated over time (Table 3, panel A: $\rho = 0.45$, $p<0.01$). These results imply that talented managers are identified and rewarded for superior performance over subsequent periods. This begs the following questions: (1) how are targets updated, and (2) does this updating process work in the sense that managers perform activities that help the firm achieves its sales growth objective? That is, is it true that the best performers according to the performance appraisals system achieve the highest sales levels? In the next two sections I address these questions.

Table 3: Appraisal scores and target achievement over consecutive periods

Persistence of appraisal scores and target deviations across consecutive periods. Appraisals in Panel A are the same over consecutive periods if the combination of sales and compliance scores are equal over two or three periods. Correlations in panel A are calculated over 5 appraisal scores: 1=A1, 2=(A2 or B1), 3=B2, 4=(B3 or C2) and 5=C3. Target deviations are considered the same if the store manager exceeded the target over two or three consecutive periods. Correlations in Panel B are calculated over dummy variables where the dummy equals one if actual sales ≥ sales target, zero otherwise.

Panel A: Performance Appraisals

	Comparison Appraisals: t and t+1	*Comparison Appraisals: t+1 and t+2*	*Comparison Appraisals: t, t+1 and t+2*
Equal appraisal	42%	54%	20%
Different appraisal	58%	46%	80%
Total	100%	100%	100%

Pearson correlations of consecutive appraisals: = 0.45 (p<0.01)

Panel B: Sales target attainment (i.e. actual sales ≥ sales target)

	Comparison target attainment: t and t+1	*Periods t+1 and t+2*	*Periods t, t+1 and t+2*
Attain (exceed) target	46%	50%	22%
Sub target	54%	50%	78%
Total	100%	100%	100%

Pearson correlations of consecutive sales target attainments: 0.07 (p=0.312)

2.3 Target updates and store management appraisal

In this section I examine how the firm uses the control system to motivate store managers. The firm uses financial targets to evaluate performance and to determine variable pay. The firm additionally imposes directives on retail store managers. In this section I establish how sales target deviations and compliance with directives affect future targets. I also aim to establish whether top management's distinction between top, mediocre and bottom level retail store managers during the subjective appraisals is consistent with the sales potential of those store managers.

2.3.1 Target ratcheting

The firm identifies store managers' sales talent through past sales performance and uses this information to set sales targets. Once a store sets a 'store record', firm management assumes this level to be the least performance the retail store can achieve (Murphy, 2001; Leone et al., 2004). The firm sets targets asymmetrically such that underperformance compared to the target will prompt top management to decrease

next-year targets to a lesser extent than that the targets are ratcheted up subsequent to a favorable store performance.[15] To examine the magnitude of asymmetric target ratcheting empirically, I use the following model:

$$TARGET\_UPDATE_{i,t} = \beta_0 + \beta_1 DEV\_TARGET_{i,t} + \beta_2 ADV_{i,t} * DEV\_TARGET_{i,t} + \beta_3 ADV_{i,t} + u_{i,t}, \quad (1)$$

where $TARGET\_UPDATE_{i,t}$ represents the change in target sales for store i from period t+1 relative to period t (i.e. $TARGET_{i,t+1} - TARGET_{i,t}$), $DEV\_TARGET_{i,t}$ denotes the sales performance for store i in period t compared to the target (i.e. actual $sales_{i,t}$ – sales $target_{i,t}$), and $ADV_{i,t}$ is an indicator variable equal to 1 if actual sales > target sales for year t for store i, zero otherwise. The impact of positive sales target deviations on subsequent target changes is represented by the coefficient β_1. The impact of adverse target deviations on the subsequent target changes is represented by the sum of coefficients β_1 and β_2. Therefore, empirical tests for asymmetric target ratcheting imply testing for a statistically significant coefficient for β_2. The regression equations are estimated through OLS using 48 months of actual and targeted sales data starting from October 2000.[16] The results for the full sample are reported in Table 4.[17] The coefficient for positive target deviations (β_1) is positive and significant ($p<0.01$). The coefficient that represents the asymmetry in target ratcheting between positive and negative target deviations (β_2) is negative and significant ($p<0.01$). The sum of coefficients ($\beta_1+\beta_2$) representing the relation between negative sales target deviations and next period's target change is significant at the $p<0.01$ level, based on an F-test of the sum of coefficients. The results are indicative of asymmetric target ratcheting. A positive deviation from the sales target of 100 is associated with a subsequent target increase of 117, while a negative deviation of 100 results in a subsequent target decrease of 92. Thus, targets are ratcheted up more following a positive sales target deviation than targets are ratcheted downward following negative sales target deviations. The high explanatory power and F-value indicate that the model is highly significant ($p<0.01$). The results remain significant if I employ a

[15] The firm sets store level targets and does not disaggregate targets any further.
[16] Standard errors of observations from the same store may not be independent, i.e. residuals may be correlated across years (time series dependence) for a given retail outlet. For all the analyses, clustered standard errors are used that are unbiased as they account for residual dependence created by panel data structure (Petersen, 2009). Clustered standard errors account for general forms of heteroskedasticity.
[17] For both models one influential observation (Cook's D >1) is excluded from the regression analyses.

scaled model where both TARGET_UPDATE and DEV_TARGET are divided by the sales target in period t (not tabulated).

Table 4 reports the results of our regression model for five portfolios *partitioned on the magnitude of the sales target deviations.* The five portfolios range from the smallest (positive and negative) sales target deviations to the largest (positive and negative) target deviations. We observe variation in ratcheting parameters across sales target deviation size. That is, both high and low positive sales target deviations result in positive adjustments of next-year sales targets, while only large negative target deviations result in downward adjustments of subsequent sales targets. Both small and large positive target deviations thus impact the next-year sales target, while only large negative deviations are impounded in subsequent sales targets. In Table 4, the sum of β_1 and β_2-coefficients are positive only from the > 60% portfolio (1.75 - 0.88 and 1.15 - 0.21, respectively). In all other cases (low) negative target deviations are ignored. This is consistent with Leone et al. (2006) who argue that firms adjust targets upward following above-target performance from controllable (effort) or uncontrollable (exogenous shocks) factors, but firms only adjust targets downward following substandard performance to the extent that results can be attributed to uncontrollable factors. In this sample, small negative deviations are considered to result from substandard managerial effort while large negative target deviations are considered to result from factors extending beyond the manager's influence. The β_2-coefficient representing asymmetry in target setting is significant in all analyses.[18]

[18] It may be argued that, given how managers differ in terms of their ability to achieve sales growth, the firm bases target updates on sales growth rather than on target deviations. We assume that: (i) the current target is impacted by actual sales in the prior period such that current targets in most cases exceeds prior sales levels; and (ii) the degree to which sales targets exceeds prior sales depend on whether the store reports a positive or negative prior sales change. We test the following model: $TARGET\_UPDATE_{i,t} = \beta_0 + \beta_1 DEV\_SALES_{i,t} + \beta_2 ADV_{i,t} * DEV\_SALES_{i,t} + \beta_3 ADV_{i,t} + u_{i,t}$, where $DEV\_SALES_{i,t}$ equals ($sales_t$ - $sales_{t-1}$) and $ADV_{i,t}$ is an indicator variable equal to 1 if $sales_t < sales_{t-1}$ for year t for store i, zero if not. The results show that positive changes of 100 prompt management to ratchet targets upward with 94, while negative sales changes of 100 lead to downward adjustments of 117 (not tabulated). Both positive and negative sales changes ultimately lead to sales targets that do not exceed prior sales. Consistent with interviews with firm management that establish that sales target deviations are used as basis for target ratcheting, the explanatory power of this model is considerably lower relative to the model specified in equation (1).

Table 4: Asymmetric target ratcheting for full sample/subsamples

This table presents the analyses of the target updating process for the full sample and for five equal-size portfolios classified by absolute target deviation magnitude. I run a pooled OLS regression of target updates. The model has the following specification:

$TARGET\_UPDATE_t = \beta_0 + \beta_1 DEV\_TARGET_t + \beta_2 ADV_t * DEV\_TARGET_t + \beta_3 ADV_t + u_t$

$TARGET\_UPDATE_t$ denotes the change in the sales target from period t+1 relative to period t, DEV_TARGET_{t-1} denotes the deviation from the sales target in period t, and ADV_t is an indicator variable equal to one if the sales target deviation < 0 in period t, zero otherwise. The t-statistics are reported in parentheses based on clustered standard errors that take into account heteroskedasticity and autocorrelation. *, **, *** is statistically significant at respectively 10%, 5%, and 1% level (two-tailed).

Dependent variable	$TARGET\_UPDATE_t$					
Portfolio's	Full sample	0-20%	20-40%	40-60%	60-80%	80-100%
Intercept	22814***	-976	-15727	-502	-4632	28994*
	(6.43)	(-0.10)	(-2.26)	(-0.04)	(-0.54)	(1.72)
DEV_TARGET_t	1.17***	3.49***	2.70***	1.61***	1.75***	1.15***
	(21.61)	(3.01)	(9.44)	(7.07)	(6.66)	(12.76)
ADV_t* DEV_TARGET_t	-0.25***	-3.47***	-3.05***	-1.84***	-0.88***	-0.21*
	(-3.08)	(-2.76)	(-9.74)	(-6.17)	(-3.46)	(-1.87)
ADV_t	-468	12798	4952	-35590**	21430	-5902
	(-0.12)	(1.31)	(0.60)	(-2.26)	(1.50)	(-0.38)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
F-test ($\beta_1 + \beta_2 = 0$)	406.80***	0.00	4.42**	1.12	85.93***	203.73***
R^2	0.83	0.35	0.82	0.78	0.89	0.94
F-statistic	644.42***	9.98***	62.81***	92.43***	284.49***	541.23***

2.3.2 Compliance with directives and sales

In addition to the sales targets, the firm deploys directives that are purportedly related to sales. I investigate in this section whether store managers who demonstrate greater compliance with directives are subjected to higher sales targets.

Compliance with directives and target setting

Indjejikian and Nanda (2002) suggest that managers take all available information into account when updating targets. While the firm does not set explicit targets for directives, firm management believes that directive compliance is informative about the manager's ability to comply with prescribed directives and therefore to report higher future sales. This suggests that superiors take compliance scores into account when setting sales target for the subsequent period. I examine whether sales targets are informed by directive compliance using the following model:

$$TARGET\_UPDATE_{i,t} = \varphi_0 + \varphi_1 DEV\_TARGET_{i,t} + \varphi_2 COMPLIANCE\_G_{i,t} + \varphi_3 COMPLIANCE\_M_{i,t} + w_{i,t}, \quad (2)$$

where $COMPLIANCE\_G_{i,t}$ is an indicator variable equal to 1 if the store manager of retail store i received a favorable evaluation on compliance with directives (i.e. A) at the end of period t, zero if not, and $COMPLIANCE\_M_{i,t}$ is an indicator variable equal to 1 if the manager of retail store i received a sufficient evaluation on compliance with directives (i.e. B) at the end of period t, zero otherwise. This analysis is restricted to observations that have the same manager for retail store i in the consecutive year. I expect: $\varphi_2 > 0$ and $\varphi_3 > 0$. Regression equations are estimated using OLS with 36 months of actual and target sales data, data about ratings on compliance with directives, and store manager-staffing data starting from October 2001.[19] Table 5 reports the empirical results of model 2. The coefficient that reflects the association between a favorable evaluation score and subsequent target change (φ_2) is positive and significant ($p<0.07$). A favorable compliance evaluation over period t is associated with a subsequent target change of €31K. This result suggests that top management takes compliance scores into account when updating targets. Firm management measures the talent of store managers to increase sales in compliance with directives. The results remain significant if I employ a scaled model where both

[19] We analyze this with 36 months because we have performance appraisal data over a 3-year period.

TARGET_UPDATE and DEV_TARGET are divided by the sales target in period t (not tabulated). Taken together, the results suggest that top management indeed takes subjective appraisal scores into account when setting next-period sales targets.

The results suggest that subjectivity could be viewed from a different perspective than documented in earlier work. Prior studies show that superiors are inclined to attach more weight to objective and common measures of performance than to subjective measures, leading to an underutilization of subjective measures (e.g. Ittner et al., 2003; Lipe & Salterio, 2000). Moreover, Lazear (1999) and Moers (2005) document that performance measure diversity 'leads to more lenient performance ratings and less differentiation among employees.' While it has been recognized that subjective performance measures may reduce measurement noise (Lazear, 1999), I document that the subjective information is used to set the next-period target. The variation in targets evolving from this process expresses the potential of each retail store manager to improve performance given their past performance. Firm management assumes that compliance and future sales are related. I evaluate whether that is the case in the next subsections.

Table 5: Impact of compliance with directives on target setting

Table reports regression estimates from a pooled OLS regression of the following model:

$$TARGET\_UPDATE_t = \varphi_0 + \varphi_1 DEV\_TARGET_t + \varphi_2 COMPLIANCE\_G_t + \varphi_3 COMPLIANCE\_M_t + w_t$$

$TARGET\_UPDATE_t$ denotes the change in target sales from period t+1 relative to period t, DEV_TARGET_t denotes sales target deviation in period t, $COMPLIANCE\_G_t$ is an indicator variable equal to one if the store manager received a favorable score in compliance on directives in period t, zero otherwise, and $COMPLIANCE\_M_t$ is an indicator variable equal to one if the store manager received a sufficient score in compliance on directives in period t, zero otherwise. T-statistics are reported in parentheses based on clustered standard errors that take into account heteroskedasticity and autocorrelation. *, **, *** is statistically significant at respectively 10%, 5%, and 1% level (two-tailed).

Dependent variable		$TARGET\_UPDATE_t$
Model specification	Prediction	
Intercept		41336***
		(4.10)
DEV_TARGET_t		0.95***
		(14.51)
$COMPLIANCE\_G_t$	+	31117*
		(1.84)
$COMPLIANCE\_M_t$	+	15189
		(1.51)
Year dummies		Yes
Number of obs.		152
R^2		0.77
F-statistic		129.44***

2.3.3 Stickiness in performance appraisals

Recall that I compared sales target updates for top financial performers and second-ranked financial performers in Table 2. I observed that sales target deviations (sales changes) differ hardly (substantially) among top financial performers and second-ranked financial performers. Table 3, Panel A suggests that managers are likely to stay in the same performance appraisal bracket ($\rho = 0.45$; $p<0.01$) over consecutive periods. This implies that store managers are likely to receive a similar appraisal over consecutive periods. I now test this association through multivariate analysis, i.e. to what extent does prior period appraisal explain current appraisals if I control for the

objective measures of current performance (i.e. sales target deviation and labor hours target deviation). I test this with the following equation:

$$APPRAISAL_{i,t} = \alpha_0 + \alpha_1 DEV\_TARGET_{i.t} + \alpha_2 DEV\_LABORTARGET_{i,t} + \alpha_3 APPRAISAL_{i,t-1} + e_{i,t}, \quad (3)$$

where $APPRAISAL_{i,t}$ denotes the appraisal score of the store manager of retail store i in period t, $APPRAISAL_{i,t-1}$ denotes the appraisal score of the store manager of retail store i in period t-1, and $DEV\_TARGET_{i,t}$ and $DEV\_LABORTARGET_{i,t}$ denote the sales target deviation and labor hours target deviation of the store manager in retail store i in period t. This analysis is restricted to observations that have the same store manager for store i as in the previous year. Regression equations are estimated using OLS with 36 months of actual and target sales data, actual and target labor hours data, data about ratings on compliance with directives, and store manager-staffing data starting from October 2001. I present the results of the analysis in Table 6.

The results suggest that, controlling for target achievement on the objective measures, the past subjective performance appraisal is strongly associated with the current subjective appraisals ($\alpha_3 = 0.41$, $p<0.01$). This suggests that the performance appraisal contains predictive information of future performance appraisals. This begs the question as to whether or not appraisals are informative of future sales performance.

Table 6: Persistence in performance appraisal scores

Table reports regression estimates from a pooled OLS regression of the following model:

$$APPRAISAL_t = \alpha_0 + \alpha_1 DEV\_TARGET_t + \alpha_2 DEV\_LABORTARGET_t + \alpha_3 APPRAISAL_{t-1} + e_t$$

$APPRAISAL_t$ denotes the performance appraisal score in period t, DEV_TARGET_t denotes the deviation from the sales target in period t, and $DEV\_LABORTARGET_t$ denotes the deviation from the targeted labor hours in period t. T-statistics are reported in parentheses based on clustered standard errors that take into account heteroskedasticity and autocorrelation. *, **, *** is statistically significant at respectively 10%, 5%, and 1% level (two-tailed).

Dependent variable		$APPRAISAL_t$
Model specification	Prediction	
Intercept		1.58^{***}
		(5.41)
DEV_TARGET_t		0.00^{***}
		(4.23)
$DEV\_LABORTARGET_t$		-0.00^{*}
		(-1.88)
$APPRAISAL_{t-1}$	+	0.41^{***}
		(5.01)
Year dummies		Yes
Number of obs.		138
R^2		0.34
F-statistic		13.44^{***}

Lagged effect of directive compliance on sales

I examine whether compliance scores of store managers are positively associated with sales performance in the subsequent year. Because of limited data availability, I examine the predictive ability of directive compliance scores between one and six months after the last reporting period. Note that subjective appraisal outcomes are determined just after a new accounting period commences (i.e. before the end of October). The lag I examine is consistent with previous studies which argue that a frequent repurchase cycle and relatively low customer switching costs imply short time lags between the experience of customers and observed changes in purchase

behaviour and therefore economic performance (Ittner and Larcker, 1998). I test the following levels model.[20]

$$\Delta FSALES_{i,t+1} = \lambda_0 + \lambda_1 COMPLIANCE\_G_{i,t} + \lambda_2 COMPLIANCE\_M_{i,t} + \mu_{i,t}, \qquad (4)$$

where $\Delta FSALES_{i,t+1}$ denotes the change in sales for store i from the first one up to six month(s) of sales of year t+1 relative to first one up to six month(s) of sales of year t, i.e.: $\left(\sum_{m=1}^{1,2,3,4,5,6} A_{i,t+1,m} - \sum_{m=1}^{1,2,3,4,5,6} A_{i,t,m} \right)$, where A denotes actual sales, t+1 and t denote budget year t+1 and budget year t respectively, and m denotes monthly periods in the respective budget year with m = 1, .., 12) for store i. This analysis is restricted to those observations that have the same store manager for store i in the subsequent year. I expect that $\lambda_1 > 0$ and $\lambda_2 > 0$. The regression equation (4) is estimated using OLS with 42 months of actual and targeted sales and labor hours data, data about ratings on compliance with directives, and store manager staffing data from October 2001.

The results presented in Table 7 provide support for the conclusion that the talent of store managers to comply with directives is positively associated with future sales performance in their stores. Favorable appraisal scores (relative to unfavorable appraisals) are associated with sales increases of €11K, €18K, €24K, €26K, €32K, and €30K over the first up to six months following the subjective. While lower in magnitude, for store managers with sufficient evaluations I also document significant positive relations with future sales. Overall, I interpret this evidence consistent with the premise that the ability of store managers to comply with directives is positively associated with subsequent sales performance of retail stores. The results add to the findings reported by Hayes and Schaefer (2000) who find that managers are rewarded for good performance on measures observable only to contracting parties. Here, store managers are rewarded for compliance with directives by means of higher appraisal scores, where appraisal scores are positively associated with future sales performance.

[20] Since time series behaviour of sales can possibly be described by a random walk model, the resulting stochastic trend can cause some econometrical problems such as non-normal distributions of t-statistics and spurious regression (Verbeek, 2004). To address potential concerns, for the respective levels model we define the change in sales as the dependent variable instead of a specification with current sales as the dependent variable and lagged sales as an independent variable.

Table 7: Impact of compliance of directives on subsequent sales

Table reports regression estimates from a pooled OLS regression of the following model:

$$\Delta FSALES_{t+1} = \lambda_0 + \lambda_1 COMPLIANCE\_G_t + \lambda_2 COMPLIANCE\_M_t + \mu_t$$

$\Delta FSALES_{t+1}$ represents sales change from the first one up to six month(s) of cumulative sales in period t+1 relative to the first one up to six month(s) of cumulative sales in period t, COMPLIANCE $\_G_t$ is an indicator variable equal to one if the store manager received a favorable score in compliance on directives in period t, zero otherwise, and COMPLIANCE$_M_t$ is an indicator variable equal to one if the store manager received a sufficient score in the compliance in period t, zero otherwise. T-statistics are reported in parentheses based on clustered standard errors. *, **, *** is statistically significant at respectively 10%, 5%, and 1% level (two-tailed).

Dependent variable		$\Delta FSALES_{t+1}$ for first 1 to 6 consecutive month(s)					
Model specification	Prediction	First month	First 2 months	First 3 months	First 4 months	First 5 months	First 6 months
Intercept		-6153*** (-3.15)	-19618*** (-5.15)	-21153*** (-3.49)	-31435 (-4.07)	-49337*** (-5.29)	-58027 (-5.44)
COMPLIANCE $\_G_t$	+	10567*** (4.03)	17693*** (3.88)	23994*** (3.35)	26240*** (3.00)	32005*** (3.16)	30189** (2.54)
COMPLIANCE $\_M_t$	+	8782*** (4.24)	14228*** (3.53)	20200*** (3.08)	22595*** (2.76)	27672*** (2.89)	28477*** (2.64)
Year dummies		Yes	Yes	Yes	Yes	Yes	Yes
Number of obs.		218	218	218	218	218	218
R^2		0.16	0.31	0.19	0.22	0.31	0.30
F-statistic		10.77***	39.30***	19.45***	25.76***	34.30***	35.99***

Are appraisals rightly sticky?

One remaining issue is whether the firm's management rightly provides favorable, sufficient, and unfavorable appraisal scores that maintain over time. That is, are the managers with high performance appraisals indeed the same managers that advance sales to the expected levels? I therefore test whether store managers who show good sales performance in one period continue to show relatively better (sales) performance over the subsequent periods. If this is the case, store managers retain their rank for good reasons in that they improve performance over consecutive periods of time. I test this by regressing sales changes on lagged sales changes ($\Delta SALES_{i,t} = \delta_0 + \delta_1 \Delta SALES_{i,t-1} + z_{i,t}$), while including year dummies and employment of clustered standard errors. I test whether $\delta_1>0$. I find a significant relation ($\delta_1=0.20$; $p<0.06$) between sales changes over periods (not tabulated). So, compared to their colleagues, store managers who demonstrate large (small) sales increases in one period are likely to persist in achieving relative high (low) sales increases over time. This evidence confirms the rationale for managers staying in the same performance appraisal bracket and supports the idea that, despite the subjectivity involved in the performance appraisal process, the firm rightly discriminates between 'good' and 'bad' performers. Taken together, the results suggest that the target is set conditional on past effort so as to motivate managers to achieve increasing sales levels. Managers are best motivated if on average they are likely to exceed the target.

Conclusion on the interplay of subjective appraisals and targets

Taken together, the results are related to the findings of Indjejikian and Nanda (2002) who find an association between current and future target attainment. However, Table 3, panel B suggests that current and future target attainment are not associated in this setting. This finding is consistent with the intuition that Indjejikian and Nanda (2002) propose, i.e. that target updates contain all information allowing each store manager to have an equal probability of target attainment. The firm uses both information from prior sales performance and subjective appraisals to set challenging targets for all managers. That is, managers who receive high appraisal scores report the highest sales changes, not the highest sales target deviations (Table 2). Moreover, I document significant associations between consecutive appraisal scores (Table 3, panel A and Table 6). The firm management's distinction during the subjective appraisals between top, mediocre and bottom level managers is consistent with the sales potential of those

managers. That is, appraisals contain information about the potential of each manager to improve performance given their past performance. So the system simultaneously gives incentives for the store manager to attain the current sales target (bonus) and to consider future performance (i.e. directive compliance). In other words, managers have an equal probability of attaining the target and the target is set to be challenging for each individual manager, while the appraisals direct the store manager's attention to the next-period sales. Hence, in terms of Indjejikian and Nanda (2002) next-period targets do indeed contain all information. However, the current year subjective appraisal of managers already values the expected next-year sales performance.

2.4 Adverse effects of the target setting process

The results so far suggest that the target updating and performance appraisal process is consistent with the firm's objective to enhance sales levels over time. In this section I examine potential adverse effects of this target updating process. I examine in particular whether managers slow down sales to manage future targets downwards. I find that managers engage in undesirable behaviour under target ratcheting. Store managers that perform particularly well during the first three quarters tend to slow down sales in the final quarter.

Managerial effort reduction

The use of past performance to determine future targets is prevalent in many firms (Murphy, 2000; Leone & Rock, 2002: Leone et al., 2004). A possible effect of target ratcheting is that managers take measures to manager future targets down (Weitzman, 1980; Murphy, 2001; Leone and Rock, 2002) That is, favorable current performance entails higher variable pay but it may also jeopardize future bonuses and performance appraisals. Hence managers face a trade-off between present rewards and future losses because of higher targets. That is, bonuses contingent on ratcheted targets provide an incentive-based rationale for income smoothing (Holthausen et al., 1995). Murphy (2001) and Zimmerman (2004) refer to this as the perverse incentive effects of budget ratcheting. Leone and Rock (2002) show evidence of divisional managers using income-decreasing accruals to offset earnings improvements in a sample of firms that have adopted target ratcheting. Murphy (2000) found in firms that apply ratcheted standards that managers who do particularly well in the first three quarters produce

the lowest net income share in the final quarter compared to firms that use external standards (e.g. target based on peer performance).

Here this research setting deviates in important aspects from prior studies. That is, the firm makes it difficult for store managers to manipulate outcomes in that they are provided very limited leeway to manipulate results. First, the system does not allow store managers to create discretionary accruals. Store managers operate cash registers where sales are recorded and paid for instantaneously and store managers are not involved in bookkeeping. Murphy (2000) shows income smoothing for net income but not for sales and explains this through the stronger control that managers have over accounting phenomena (e.g. accruals) than they have over the timing of cash flows. Second, the discretion of store managers is restricted to day-to-day operations within the retail store. Store managers have no discretion in terms of pricing and advertising. Oyer (1998) however identifies pricing as the most important means for sales people to directly influence customer purchase timing and therefore the distribution of sales across periods. The only viable way in which store managers can curtail sales is by means of slowing down real sales activities. However, even slowing down sales activities is curbed through the system. Store managers can e.g. decelerate the number of clients served per time unit or cross-sell fewer products. However, managers are closely monitored by their supervisors who pay visits to stores (sometimes without notice) on a regular basis and store-level sales are tracked and compared with respective sales targets in a monthly fashion. In this way the firm makes it difficult for managers to manipulate outcomes, by leaving them very limited leeway to manipulate results.

Store managers do slow down sales levels

I examine whether or not store managers engage in ‘real sales management’ by slowing down sales at the end of the year if favorable sales performance occurred in the early months of the accounting year. I heed the argument developed by Brickley et al. (2004) who argue that adverse incentive effects of ratcheting could be mitigated through job rotation, since store managers will not be confronted with ratcheted-up standards in the subsequent year. Therefore, I make a distinction between: a) store managers who continue to operate as store manager in the current store; and b) store managers who leave the firm or transfer to another store as from the next period.

Potentially adverse incentive effects of asymmetric ratcheting are tested empirically through the following model:

$$SHARE_{i,t} = \gamma_0 + \gamma_1 DGYTD_{i,t} + \gamma_2 DTRANSF_{i,t} + \gamma_3 DGYTD_{i,t} * DTRANSF_{i,t} + v_{i,t}, \quad (5)$$

where $SHARE_{i,t}$ denotes the final three, two and one month(s) share of yearly sales (formally described as $\sum_{m=10,11,12}^{12} A_{i,t,m} / \sum_{m=1}^{12} A_{i,t,m}$, where A denotes actual sales, t denotes the budget year t and m denotes monthly periods in the respective budget year t with m = 1, .., 12) for store i in year t. $DGYTD_{i,t}$ is an indicator variable equal to one if the sales performance relative to the sales target in the first nine, ten or eleven months of the respective budget year ($\sum_{m=1}^{9,10,11} A_{i,t,m} - \sum_{m=1}^{9,10,11} T_{i,t,m}$) > 0 for store i in year t, zero otherwise, and DTRANSF is an indicator variable equal to one if the store manager transfers to another store, job or firm for store i in year t+1, zero otherwise. For the retail store managers that report favorable intermediate performance and continue to operate as store manager (represented by γ_1), I expect $\gamma_1 < 0$. Relative to the reference category of managers that report unfavorable intermediate performance and continue to operate as store manager, the former group of store managers have an incentive to slow down sales in the final month(s). By giving up their bonus in the final quarter they increase the likelihood of earning positive bonuses in the four quarters of the successive budget year. Finally store managers that report favorable intermediate performance and do not continue to operate as store manager do not have an incentive to slow down sales (since they will not be confronted with the target consequences of bonus-maximizing behaviour in the final quarter). Since I expect those managers to act in a similar vein relative to the reference category of managers that report unfavorable intermediate performance and continue to operate as store manager, I expect $(\gamma_1 + \gamma_2 + \gamma_3) = 0$ and therefore $\gamma_3 > 0$. Regression equation (4) is estimated through OLS using 36 months of actual and targeted sales data, and store manager staffing data from October 2001.

Table 8: Managerial effort reduction following target ratcheting

Table reports regression estimates from a pooled OLS regression of the following model:

$$SHARE_t = \gamma_0 + \gamma_1 DGYTD_t + \gamma_2 DTRANSF_t + \gamma_3 DGYTD_t * DTRANSF_t + v_t$$

SHARE denotes the final three, two and one month(s) share of yearly sales, DGYTD is an indicator variable equal to one if the cumulative sales target deviation over the first nine, ten or eleven months > 0, zero otherwise, and DTRANSF is an indicator variable equal to one if the store manager transfers to another store/job/firm in the subsequent year, zero otherwise. T-statistics are reported in parentheses that are based on clustered standard errors that take into account heteroskedasticity and autocorrelation. *, **, *** is statistically significant at respectively 10%, 5%, and 1% level (two-tailed).

Dependent variable		Share of yearly sales		
Model specification	Prediction	For the final 3 months	For the final 2 months	For the final month
Intercept		0.2366*** (103.98)	0.1566*** (109.87)	0.0737*** (78.87)
DGYTD	-	- 0.0015 (-0.64)	- 0.0027* (-1.75)	- 0.0034*** (-3.52)
DTRANSF		0.0004 (0.10)	-0.0009 (-0.38)	-0.0025 (-1.56)
DGYTD* DTRANSF	+	0.0078 (1.66)	0.0071** (2.36)	0.0059*** (3.31)
Year dummies		Yes	Yes	Yes
F-test ($\gamma_1 + \gamma_2 + \gamma_3 = 0$) F-test ($\gamma_2 + \gamma_3 = 0$)		2.99* 6.38**	2.04 8.63***	0.00 13.45***
Number of obs. R^2 F-statistic		311 0.10 11.22***	311 0.17 19.74***	311 0.07 5.72***

Table 8 reports the regression results for the final three, two, and one month(s) of the budget year.[21] The findings generally show that managers that report favorable sales performance and continue to operate as store manager show relatively lower sales

[21] The analyses focus on the final quarter of the year for the following reason. Descriptive statistic show that the fraction of managers that has a positive bonus payout decreases throughout the budget year with an especially steep decline in the fourth quarter. This is consistent with intuition that store managers cash in on the first three bonus options, at that time have more information whether they will meet the annual sales target (important for appraisal considerations) and well performing managers have an option to slow down sales in the fourth quarter (i.e. increase the likelihood to cash in on the bonus options in all four quarters in the consecutive year by giving in on their current fourth quarter bonus).

toward the end of the accounting year period compared to those managers that report unfavorable intermediate sales performance and continued to operate in the same retail outlet. The coefficient on DGYTD is negative and significant for both the final two months ($p<0.1$) and the final month ($p<0.01$).[22] Managers that report substandard sales performance and remain as the manager in the same store on average report 15.66% (7.37%) of yearly sales in the final two months (month), as opposed to 15.39% (7.03%) for managers that have a favorable sales performance and remain to operate as store manager in the same store. In terms of magnitude, store managers that report substandard sales performance report €132K (€62K) sales in the final two months (month) opposed to €130K (€59K) for managers with favorable intermediate sales performance.

For the final month, stores are subsequently ranked on the basis of their intermediate performance ranging from very unfavorable to very favorable. Especially the portfolio of stores comprising small positive intermediate sales target deviations exhibits the smallest magnitude of relative sales in the final month (not tabulated). This result is consistent with the findings in Table 4. I document in Table 4 that the upward ratcheting parameter is strongest for small positive target deviations. That is, the benefits from slowing down sales in terms of mitigating potential upward adjustment of future targets are strongest for those stores exhibiting small positive target deviations. In addition, I expect the relative sales of store managers with favorable intermediate performance that do not continue to operate as manager to exceed the relative sales of managers with a favorable intermediate performance that do continue as store manager. The former group of store managers does not have any incentives to slow down sales since they will not be confronted with target ratcheting in consecutive periods. The F-test for difference in coefficients for both groups (i.e. $\gamma_2 + \gamma_3 = 0$) yields statistically significant results for all the three periods under examination. Store managers that report favorable intermediate performance and do not continue to operate as manager report 24.33% (16.01) {7.37%} of yearly sales in the final three months (final two months) {final month}, as opposed to 23.51%

[22] An alternative explanation would be that the managers that report an unfavorable intermediate performance accelerate their sales in the final months for bonus and appraisal considerations. However only 11% of the managers that report an unfavorable intermediate performance after 11 months and continue to operate as manager have a positive bonus payout in the fourth quarter. This suggests that bonus and appraisal incentives are for the majority of poor performing managers 'out-of-the-money'.

(15.39%) {7.03%} for managers with a favorable intermediate performance that do remain to operate as store manager in the same retail store. In terms of magnitude, store managers that report favorable sales report €206K (€135K) {€62K} sales in the final three months (final two months) {final month}, as opposed to €199K (€130K) {€59K} for managers with a favorable intermediate performance. Therefore, as store managers in the sample have few alternatives other than varying effort levels, I find moderate but significant degrees of reduction of real sales performance.[23]

Magnitude incentive effects

I interpret the evidence as consistent with the incentive effects of target ratcheting. That is, negative effects are associated with target ratcheting. However, elimination of the reported adverse incentive effects would result in a 4% increase in earnings before taxes for the respective business unit over the period 2001-2004 (€500,000). The decrease in the relative share of sales for the final month(s) for those respective store managers would result in a 7% bonus increase for the respective store managers.

Robustness checks

With respect to the means through which store managers slow down sales activities in the final periods of the budget year, I examine whether stores that report favorable sales after nine months have a relatively lower use of labor hours for the final three months. I do not find any significant results. As robustness analyses, I repeat the analyses adding fixed effects regression to control for unobserved heterogeneity at the store level. Results remain significant at conventional levels (not reported).

2.5 Conclusions and limitations

This paper documents the interplay between firm management setting targets and store managers' response to target setting. Firm management is convinced that store managers' sales performance can improve and looks for avenues that allow them to identify in which stores underutilization of sales capacity resides. In addition to these conditions firm management must deal with store managers who vary in terms of (sales) talent. To address both problems, the firm utilizes a target-setting and performance-appraisal system that takes issue of store management features and

[23] Interviews with senior management informed us about the probable means through which store managers can affect the timing of sales. Such illustrations include cutting back on the provision of information and advice concerning merchandise and merchandise usage/maintenance, less selling complementary products (e.g., extended guarantee).

observable performance. Store managers can earn a quarterly bonus to the extent that the quarterly sales exceed the quarterly sales target. In addition, the annual subjective performance appraisal depends on the assessments to what degree store managers comply with directives. Their performance appraisal score determines the salary increase. The results of this study support the idea that the firm updates sales targets based on sales target deviations. It does so asymmetrically in order to discriminate management effort from general economic conditions facing the store (Weitzman, 1980; Leone and Rock, 2002; Leone et al., 2004). I demonstrate that both high and low positive target deviations do impact the next-year sales target, while only large negative deviations are impounded in subsequent sales targets.

To ensure that all store managers are subject to challenging targets, managers with a favorable appraisal score face larger sales target updates than managers with a mediocre or unfavorable appraisal score. That is, sales target updates are higher for those managers that are better able to comply with directives. This suggests that the higher sales target that 'good' managers have to meet and the relatively lower targets that 'mediocre' managers have to meet serves the purpose of challenging all types of retail store managers. Discriminating between good', 'mediocre' and 'bad' performers based on compliance with directives enables the firm to establish manager-specific targets. This motivates individual store managers to produce the best result in their own league. I do find that store managers are subject to sales targets consistent with the intuition of Indjejikian and Nanda (2002). That is, past sales target attainment is unrelated to future target attainment. Moreover, I document that past performance appraisals are predictive of current performance appraisals. The firm management's distinction between top, mediocre and bottom level managers based on the subjective appraisals is consistent with the sales potential of those managers. That is, appraisals contain information about the potential of each manager to improve performance given their past performance. In this way, the system simultaneously gives incentives for the manager to attain the current sales target (bonus) and to consider future performance (i.e. directive compliance).

The empirical findings of this study can place subjective performance appraisals in a new perspective. It has been argued that subjectivity can decrease the noise in the measure (e.g. Prendergast and Topel, 1993; Lazear, 1999). The results suggest that

subjective appraisals are informative of future performance and that they are therefore used in target setting. I observe in this sample that firm management cogently sets different targets to account for differences in store management talent. While this process may lead to some levels of lenience and failure to discriminate good from bad managers (Moers, 2005) I observe that for a considerable part of the sample, firm management does discriminate 'good' from 'bad' performers. The contemporaneous and future sales performance that the firm achieves with this process suggests that making this difference between retail store managers pays off in that each manager is motivated to increase effort.

I document that store managers who do well during the course of the year slow down effort levels increasingly in the final months of the accounting year. To find this effect is remarkable in this setting as firm management has made it virtually impossible to manage performance measure outcome through other means than effort reduction. This result suggests that the negative incentive effect that follows from target ratcheting is strong since they have limited means to mitigate target ratcheting. I also document that, consistent with the ratcheting theory (Brickley et al., 2004), managers that leave the store (and thus will not be confronted with the consequences of target updates following good sales performance) are less likely to reduce sales levels at the end of the year than managers that remain at their retail store.

As with most research, this study is subject to limitations. One important caveat is that the external validity of the findings cannot be extended beyond this sample. This quantitative field study enables me to examine how target setting affects management responses in this retail setting. However, contextual findings limit the extent to which these findings can be generalized to different settings. For instance, I conduct this study in a centralized firm. The results may deviate for more decentralized settings (e.g. Bouwens and Van Lent, 2007). Notwithstanding these limitations, I believe that the findings advance knowledge into the working of target setting within firms. Especially in firms where local management's decision rights are low and strict directives apply. Future research may cross-sectionally examine which firms benefit most from using information from subjective performance appraisals combined with past sales information to establish manager-specific challenging targets.

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Appendix 1: Directive areas

Dimension	Description
Innovation	• Identify relevant changes in the environment of your retail stores, think about creative ways to address challenges within retail stores, and provide ideas to/initiate discussion with your cluster manager. • Seek alternative ways to fulfill customers' needs and inform customers about new goods and services.
Entrepreneurship	• Communicate clearly (e.g. free of jargon) to customers and always keep the best interest of customers in mind. • Increase your availability for customers and sales assistants and address everyday problems (e.g. traffic at cash registers) in a timely manner.
Efficiency	• Translate the impact of each decision in terms of costs and sales and act accordingly. • Prioritize operations within the sales team such that arrangements with customers are always met.
Responsibility	• Display an active attitude and behavioral pattern that is inspiring for your sales assistants. • Be able to explain the relationship between your actions and the targeted retail store results (and consider potential side effects that can follow from actions chosen).
Cooperation	• Provide timely and clear feedback to your sales assistants such that sales assistants know exactly what is expected from them. • Create an atmosphere where sales assistants provide feedback about each other's performance, ensure that sales assistants remain confident about their own abilities, and promote sales assistants working together.

Chapter 3: Managerial horizon and the choice for insiders versus outsiders[24]

3.1 Introduction

This paper investigates whether CEOs appointed from outside the firm are provided with different incentives than CEO successors selected from within the firm to address potential distortions in intertemporal decision-making. It is asserted that outside CEO successors are more short-term oriented compared to inside CEO successors because of two reasons. First, outside CEO successors are reported to have shorter (anticipated) tenure compared to inside CEO successors (e.g. Brady et al., 1982). That is, the more diversified human capital of outside CEO successors enhances outside employment opportunities vis-à-vis inside CEO successors who possess more firm-specific knowledge that is characterized by limited value outside the respective firm (Parent, 1999). The shorter a CEO expects to stay in position, the smaller the benefits from future cash flows and the greater the incentives to sacrifice long-term benefits for short-term benefits (Narayanan, 1985). So outside CEOs with a shorter employment horizon can be myopic with regard to the long-term effects of their decisions. Second, boards have superior knowledge of the abilities of inside candidates because of the opportunity to update their assessment more accurately over multiple periods relative to outside contestants (Zajac, 1990). Outside CEO successors who just assumed their position have yet to establish a reputation and will be focused on activities that produce quick wins. That is, they will be inclined to emphasize actions that yield short-term profits even at the expense of firms' long-term interests in an attempt to quickly build a reputation within the firm (Narayanan, 1985).

To examine whether firms account for the alleged short-termism of outside CEO successors through the incentive compensation packages, I distinguish between short-term oriented and long-term oriented incentives. Short-term incentives are incentives tied to short-term backward looking measures such as current earnings that reward short-term oriented effort. Long-term incentives are tied to long-term backward looking measures such as future earnings or forward looking measures such as stock price that rewards long-term oriented effort (Dikolli, 2001). I argue that firms can use incentive package features to account for potential distortions in intertemporal

[24] This chapter is based on a working paper co-authored with Jan Bouwens (Tilburg University).

decision making entailing the type of succession. As outside CEOs are allegedly more short-term oriented than inside CEOs, I expect that outside CEOs are subjected to incentives that redirect their attention to decisions with long-term impact. I argue in particular that de-emphasizing current earnings while emphasizing future earnings and/or stock price in the respective CEO incentive plans lengthens the time orientation of these managers.

To my knowledge this is the first study to explicitly study whether or not firms account for short-termism that newly appointed managers possibly display.[25] Anecdotal evidence suggests that firms may not fully anticipate and account for short-termism of outside CEO successors beforehand. Bower (2007) argues that the selection of outside successors should be discouraged because of their tendency to quickly change things upon arrival to rapidly show results. More specifically it is stated that:

> …the only way to change things fast is to cut costs - exactly what someone unfamiliar with the specifics of an industry and its markets, or the company and its people, is likely to do first…This short-term orientation destroys value in the medium and long-term. The seeds of growth are eliminated. (p.93)

In their 2007 report, the Committee for Economic Development (CED) issued a set of recommendations to address the short-termism manifest in some corporations. One recommendation was the promotion of CEO succession plans that emphasize growth of internal management talent. Doing so may counter the pressures to achieve short-term performance. More particularly it was contended in the document that:

[25] Note that short-termism of outside successors may in some cases be an equilibrium outcome that reflects firms' objectives. For example, outside succession may be driven by poor prior performance (Parrino, 1997) which could explain the need for short-term orientation. Still, most outside successions are not motivated by poor pre-turnover performance. Murphy & Zabojnek (2007) provide alternative explanations for - the increasing trend in – outside CEO succession. Moreover, strategy literature distinguishes two components in corporate turnaround: divestures of unproductive assets, and investment in positive NPV projects with cash flows materializing in the future (Robbins & Pearce, 1992). In general, internal and external governance can work as mechanisms that mitigate a short-term orientation of outside successors. Elimination of myopic time preferences may be regarded as too costly. Time orientation of CEO successors is regarded as an equilibrium outcome that simultaneously reflects firm's objectives, the mitigating effect of governance, and some personal potentially myopic preferences (Abernethy et al., 2007). In turn, firms design compensation packages that address incongruent time orientations of CEO successors.

> …a CEO from another company…wants to be protected against the risk of being dismissed if expectations are not met quickly…By contrast, a CEO from an internal executive program already has a long-term view of the company when he or she takes office. (p.16)

If inside CEOs differ so markedly in time orientation from outside CEOs it may be expected that firms take issue when designing incentive contracts for either type of CEO. I empirically investigate these differences. This enquiry is based on a UK sample of 171 CEO successions from 1998 to 2004 of firms listed on the main market of the London Stock Exchange.

The results suggest that firms anticipate and account for short-termism of outside successors. That is, outside CEO successors are provided with less short-term incentives and more long-term incentives compared to inside successors. More specifically, outside successors are awarded less short-term incentives, measured by the cash bonus elasticity to accounting performance, compared to inside CEO successors. The results become insignificant when looking at the cash bonus elasticity to market performance. This is consistent with earlier findings of Lambert & Larcker (1987) who show that cash compensation is more closely tied to accounting performance than to stock market performance. Outside CEO successors are awarded more long-term incentives, measured by the elasticity of the value of the CEO equity portfolio wealth to market performance, relative to inside CEO successors. Therefore, the results suggest that firms anticipate short-termism of outside CEO successors, as outside successors face less short-term and more long-term incentives compared to inside CEO successors. In the robustness analyses, supplementary checks are performed that amongst others address the potential endogeneity of the choice for an outside vs. inside CEO successor. Inclusion of a broad range of proxies for loss-making firms supplemental to the original control variable; matching firms that select outside successors to firms that select inside successors on the likelihood that the respective firm would select an outside CEO successor (referred to in the literature as propensity score matching); and application of a treatment effects model all generate results similar to those I report in the main analysis.

Following that a significant amount of the heterogeneity in investment, financial, and organizational practices in firms is explained by individual CEOs (Bertrand & Schoar,

2003), topics with respect to the pre- and post-turnover performance effects of CEO turnover have been relatively well-explored. I heed the advice of Brickley (2003) to decrease the emphasis on such topics and to consider other less-explored issues to increase the understanding of CEO replacement. More specifically, I examine to what extent firms anticipate and account for the short-termism of outside CEO successors through providing different incentives to outside versus inside CEO successors. In doing so, this paper fills up a void in the previous literature since most studies focus on documenting managerial opportunism (e.g. horizon problems) but few studies examine whether firms apply compensation design to prevent managerial opportunism (Cheng, 2004).[26] Furthermore, the appointment of outside managers is positively associated with stock market returns and subsequent accounting performance (Huson et al., 2004). Still, the decision to appoint an outsider is the result of the firm weighing the net value of the outside versus inside appointment. An important part of costs entailing this trade off is in the type of manager: outside managers are arguably more short-term oriented than inside managers. The firm can improve the case for an outside appointment when it is able to mitigate this short-term orientation. This study demonstrates that outside appointments are indeed accompanied with incentive contracts designed to direct attention to the long term rather than to the short term.

The UK data allows me to disentangle long-term contract features from short-term features. Most US firms feature long-term incentive plans with bonus awards contingent on three to five-year cumulative accounting performance (Murphy, 1998), and stock and stock options that typically vest irrespective of performance in approximately 30 months (Kole, 1997). US managers are therefore provided with incentives to select actions that maximize long-term accounting performance and medium-term market performance. The joint use of these accounting and stock based incentives in the US makes it difficult to tell whether incentives are geared to affect long or medium-term performance.[27] Since the theory predicts that new CEOs are

[26] Recently, some papers document that outside CEO succession is positively associated with ex-ante severance agreements. Here, risk-averse CEOs desire insurance in the firm of termination payments to compensate them for search and/or reputation costs which are likely to occur following termination (Sletten & Lys, 2006) and to induce the CEO to make relation-specific investments (Rusticus, 2006). Outside succession is argued to be associated with the ex-ante probability of turnover. Still, ex-ante severance agreements are costly as they weaken the costs associated with managerial dismissal.

[27] We acknowledge the difficulty of predicting the extent to which long-term incentive plans, restricted stock, and options lengthen CEO's horizon, e.g. the forward looking characteristic of price depends on the extent to which it accurately projects future financial outcomes from CEO's current decisions.

incentivized with short-term versus long-term incentives conditional on whether they originate from inside or outside the firm, testing these predictions requires making a clear distinction between short-term and long-term incentives. The UK setting provides me with this opportunity. Because of the Greenbury report (1995), UK firms provide stock-based compensation that vests upon the attainment of long-term accounting performance targets (Conyon & Murphy, 2000). While US managers can face a trade-off between meeting long-term accounting targets and medium-term stock price, UK performance requirements for stock and accounting performance are synchronized. That is, UK managers can only reap the benefits of stock returns conditional on them also having achieved the corresponding long-term accounting performance targets. This feature allows me to better disentangle short-term incentives from long-term incentives compared to the US setting.

The remainder of this paper is organized as follows. Section two refers to the literature review and hypotheses. Section three discusses the sample, empirical models and variable measurement, while section four describes empirical results. The main conclusions and limitations of this paper are offered in the final section.

3.2 Literature review and hypotheses

CEO successions are characterized by changes in firms' operations in terms of divestures and capital expenditures (Weisbach, 1995). Newly appointed CEOs can take actions featuring short-term implications (e.g. a switch towards low-cost suppliers) and select actions that have more long-term effects on firm value (e.g. a new line of basic research). A focus on short-term actions such as switching to a low-cost supplier may be beneficial in the short run, but it may turn out to be detrimental to firm value in its long-term consequences. In the prior literature, it is argued that outside CEOs are prone to short-termism compared to inside CEOs. Hence, appointing outsiders entails the danger of managers neglecting the long-term consequences of their decisions.

The literature provides two main explanations for why outside CEOs comparatively emphasize the short term: their shorter employment horizon and their tendency to quickly build reputation in their new firm.

First, the employment horizon of outside CEO successors is arguably shorter than that of inside CEOs because of the greater outside options of outside successors. Outside

CEOs possess demonstrably more diversified human capital than inside CEO successors which allows for greater outside employment opportunities compared to inside CEO successors. Inside CEO successors posses a larger amount of firm-specific knowledge which is of limited value outside the focal firm (Parent, 1999). Fee & Hadlock (2004) explain the negative relation between an executive's tenure and the probability of obtaining a position at another public firm by the limited outside value of firm-specific capital developed at the old employer. Brady et al. (1982) report a significantly lower anticipated tenure for outside CEO successors by corporate boards. This suggests that outside CEOs who face greater outside employability than inside CEO successors have a shorter employment horizon (Mortensen, 1999). The shorter a CEO expects to stay in position, the smaller the benefits from future cash flows and thus the greater the incentive to sacrifice long-term benefits for short-term benefits (Narayanan, 1985). So outside CEOs face greater incentives to neglect long-term effects of decisions and to emphasize actions with effects that surface within the CEOs employment horizon. Palley (1997) analytically demonstrates that in a setting with management turnover where pay is tied to current earnings, managers select projects with intrinsically lower net present values, yielding higher returns at the beginning of the project's life-time. Mannix & Loewenstein (1993) find in their experiment that shorter employment horizon (i.e. an increase in job mobility) makes subjects less likely to invest in long-term projects. Dechow & Sloan (1991) report how CEOs in the final years of office improve short-term earnings performance at the expense of firm value by means of managing discretionary investments expenditures downward.

The second argument for outside CEO successors to differ in time orientation from inside successors derives from the degree of adverse selection. That is, boards have superior knowledge about abilities of inside candidates because of the opportunity to update their assessment more accurately over multiple periods relative to outsiders (Zajac, 1990). Narayanan (1985) emphasizes how in a setting where the ability of the CEO is unknown to the firm, those CEOs are inclined to take on short-term projects that report rapid returns to quickly build reputation in the firm. Outside CEO successors who have yet to build a track record at their new firms can do so by focusing on projects that generate short-term benefits. Consistent with this, Dikolli et al. (2008) document that the relationship between negative earnings surprises and

CEO turnover is stronger for CEOs with shorter tenure. That is, the weight that periodic accounting numbers receive in updating owners' priors about the CEO's uncertain ability decreases with tenure because the uncertainty about the CEO's ability decreases with tenure. The focus on achieving short-term results in order to build reputation fast reinforces the predisposition of outside CEO successors to focus on short-term gains, originating from their short employment horizon relative to inside CEO successors.

In the absence of distortions in intertemporal decision making I would expect managers to make efficient investments. This entails that managers make investments to maximize firm value, regardless of the distribution of cash flows over the time horizon (Narayanan, 1996). To the extent that CEOs are inclined to favor projects with cash flows that accrue within the (first periods of the) prospected employment horizon, firms may counter this inclination with incentives that mitigate short-termism of managers through performance measures that encourage CEOs to consider the long-term effects of decision-making. Dikolli (2001) analytically demonstrates that, opposed to contracting on short-term backward-looking measures (e.g. current earnings), which motivates actions yielding short-term consequences, contracting on long-term backward-looking measures (e.g. future earnings) or forward-looking measures (e.g. stock price) motivates managers to take actions yielding long-term performance effects. CEO bonus plans tied to annual earnings figures are typically classified as short-term incentives since bonus plans give managers incentives to reject positive net present value projects with long pay back periods (Smith & Watts, 1982). Accounting regulation affects the way earnings reflect changes in firm value on a timely basis (Dechow & Sloan, 1991). Investments in advertising, for example, are expensed in the period incurred, while expected future payoffs associated with these investments are recognized when realized. Thus executives whose compensation is tied to current earnings can boost their short-term performance (i.e. compensation) by reducing investments in advertising (Dechow & Sloan, 1991).

Motivating current actions that yield long-term consequences requires contracting on long-term oriented backward-looking measures and/or on forward-looking measures (Dikolli, 2001). In general, long-term incentives purportedly encourage executives to pursue projects that produce the highest positive net present value, irrespective of

when cash flows accrue. Incentive plans where compensation is tied to long-term accounting performance targets (e.g. 3-year earnings per share target) incentivize managers to focus on the long-term consequences of current actions. Indeed, under such plans managers want to select actions that show earnings effects within the 3-year window, provided that the manager intends to retain his position over the three-year window. Larcker (1983) documents that the adoption of long-term incentive plans in executive compensation packages leads to an increase in capital expenditures relative to similar non-adopting firms.

In addition to long-term accounting performance measures, the use of stock price is appealing as share price impounds projected future financial outcomes resulting from current actions (Dutta & Reichelstein, 2003).[28] Managers' underinvestment in projects that yield long-term benefits is therefore mitigated by equity-based incentives as these become an instrument for matching future investment returns with current investment expenditures (Dutta & Reichelstein, 2005). Note that awarding incentives tied to share prices rather than accounting measures also comes at a cost because of the inclusion of market-wide factors that are largely beyond the control of managers. The increased risk exposure that equity-based incentives entails makes contracting with risk-averse agents more costly (e.g., Keating, 1996). Restricted stock and stock options are both contingent on future stock price. Restricted stock awards endow managers with a fixed quantity of shares of corporate equity with restrictions on resale or transfer and a forfeiture clause that invalidates the award if the executive quits or is dismissed before the restriction period elapses. Stock option plans award executives the right to purchase a fixed number of shares of common stock at a predetermined exercise price over some finite horizon. Vesting of this right generally takes place about 30 months after the award date (Kole, 1997). Restricted stock and stock options include multiyear components, as they not only provide incentives to take actions that increases current stock price to the extent that this also increases stock price at the end

[28] An opposing view is that even in efficient markets contracting on current price may also result in myopia where managers inflate current earnings at the expense of longer-term benefits (e.g. Stein, 1989). However such models typically assume information asymmetry (stock market uses current earnings to forecast future value) and the absence of restrictions on selling stock. This myopia decreases with the sensitivity of future stock market projections on current earnings and longer holdings periods of equity.

of the restriction or vesting period (Bizjak et al., 1993).[29] Farrell et al. (2008) find in their experiment that including forward-looking measures in incentive contracts encourages short-horizon employees to allocate current-period effort to actions that increase future profitability. Moreover, these benefits decrease as the employment horizons of employees converge with the firm's profitability horizon. Regarding the question whether firms actively account for short-termism of their executives, Cheng (2004) finds that for CEOs in the final years of office, firms prevent potential opportunistic reductions in R&D by strengthening the link between CEO compensation and R&D expenditures.

In addition to motivational effects, stock-based incentives also feature retention effects. Forfeitable equity compensation reduces voluntary turnover by imposing a cost on the executive to the extent that the prospective employer is not willing to fully reimburse these costs. Balsam & Miharjo (2007) find that the intrinsic value of unexercisable in-the-money options, the time value of unexercised stock options, and the value of restricted shares are inversely related to voluntary executive turnover. Therefore stock-based incentives and long-term incentive plans also alleviate the horizon problem by literally extending the expected employment horizon.

To conclude, I argue that outside CEOs are more short-term oriented than inside CEOs because they have more outside employment opportunities than inside managers, and because they need to establish a reputation that inside managers already posses when they assume their position. To the extent that the time orientation of outside CEOs differs from the desired time orientation, firms want to ensure that the time orientation of the managers is aligned with the firm's interests. The firm is therefore likely to draw the attention of outside CEO successors to the long-term effects of their decisions. To achieve this objective the firm can tie CEO wealth to the long-term effect of their decisions. I thus expect outside CEOs' wealth to be more (less) dependent on long-term (short-term) incentives than the wealth of inside CEOs.

[29] Motivating managers to maximize current stock price provides optimal investment incentives in perfect markets with homogeneous expectations. This need not hold in the presence of asymmetric information. If the manager has private information about the value of investment opportunities and the market learns about those opportunities as cash flows materialize, managers can have incentives to manipulate the market's inferences about firm prospects through observable, though suboptimal, investment choices. Optimal investment is motivated by structuring compensation such that the emphasis on current and future stock price performance is balanced. Future is defined here as the time it takes before the market is informed of cash flow implications of current investment decisions (Bizjak et al., 1993).

I propose to test the following hypotheses on whether the firm anticipates and accounts for the alleged short-term orientation of outside CEO successors:

H1a: Outside CEO succession is negatively associated with the provision of short-term incentives, relative to inside CEO succession.

H1b: Outside CEO succession is positively associated with the provision of long-term incentives, relative to inside CEO succession.

3.3 Methodology

3.3.1 Sample

This study uses data from a sample of UK firms listed on the all share index of the London Stock Exchange (LSE) from 1998 to 2004. To identify CEO turnover, for each respective firm-year the identity of the top executive was inferred through Boardex and Worldscope CDs.[30] CEO turnover is identified when the CEO identity changes from one to the next year for the respective firm. The CEO successions must satisfy the following criteria: i) the firm in question is not a financial institution[31]; ii) the CEO succession is unrelated to a take-over or merger; and iii) the CEO successor stays in office for at least two years (Huson et al., 2004). This yields an initial sample of 302 CEO turnover observations.

CEO successor data is collected through annual reports and press announcements from LexisNexis. New CEOs are defined as an outside successor if, at the time of appointment as CEO successor, the CEO had been at the firm for one year or less (Huson et al., 2004). Post-turnover accounting performance data is collected from Compustat Global, data with regard to CEO characteristics is collected from Boardex, and governance variables and remaining control variables are collected from Amadeus, Datastream, Worldscope, and Boardex respectively. Observations with

[30] To identify the top executive, it is first assessed whether companies have executives with the job title chief executive officer, chief executive, or CEO. For companies that do not distinguish one of these job titles, the top executive is identified as the individual with the title of managing director or executive chairman. For those observations where there is a joint top officer as defined above, I examined the annual reports to infer which executive holds responsibility as the top executive within the firm (DeFond & Hung, 2004).

[31] All financial companies (SIC-codes 6000-6999) are excluded from the sample.

incomplete data are removed from the sample.[32] The final sample consists of 171 CEO turnover observations.[33]

The empirical analyses are focused on year t+2, where the CEO successions take place in year t. Shortly after the CEO successor takes office, CEOs are typically awarded large initial hiring grants composed of restricted stock and options as a means to align interests. For outside CEO successions cash signing bonuses are typically supplemented (Fee & Hadlock, 2003). Subsequently CEOs are awarded equity grants at the end of each period to correct for optimal portfolio levels deviations due to changes in target incentive levels (e.g. changes in investment opportunity sets), CEO selling and purchasing transactions, and changes in the equity portfolio incentives due to fluctuations in price, return volatility, and time until expiration (Core & Guay, 1999). Since year t+1 is the first year that the CEO successor is operating for a full year, this year is the first year the CEO successor is awarded a full year of salary and bonus by the respective firm.

Finally, considering possible differences in compensation practices across countries, the composition of executive compensation in terms of emphasizing equity compensation and de-emphasizing salary has been converging across the US and UK (Conyon et al., 2006).

3.3.2 Empirical models

This section describes the models used to empirically test the hypotheses as well as the main variables of interest.

Two empirical models are used to examine the first hypothesis. The provision of short-term incentives is measured by means of the salary and bonus elasticity (Hall & Liebman, 1998), which can be described as follows:

$$Ln(SB_t / SB_{t-1}) = \beta_0 + \beta_1 PERF_t + \beta_2 F\_OUTSIDER*PERF_t + \beta_3 F\_OUTSIDER + CONTROLS + \varepsilon \quad [1].$$

[32] Observations are lost mostly due to missing and incomplete data in Boardex.

[33] This represents observations with complete data where the firm survives for at least two years after CEO succession and the CEO successor remains in office for at least two years. For an additional 21 observations, the CEO leaves office within two years and for an additional 15 observations, the respective firm does not survive the two year period following CEO succession.

The elasticity of salary and bonus with respect to market returns can be interpreted as the percentage increase in salary and bonus following a 1% increase in market returns.[34] In order to calculate salary and bonus elasticities, the log difference of salary and bonus is regressed on two different measures of firm performance. $Ln(SB_t/SB_{t-1})$ denotes the natural logarithm of the difference in salary and bonus for year t+2 relative to year t+1. $PERF_t$ represents both accounting and stock market performance. Accounting performance is measured as: i) change in accounting return defined as operating income divided by the book value of total assets (ΔROA) from year t+2 relative to year t+1; and ii) change in industry-adjusted accounting return defined as the industry-adjusted operating income divided by book value of total assets (ΔIA_ROA) from year t+2 relative to year t+1. The choice for operating income as denominator is motivated by the fact that, since operating income encompasses sales minus costs of goods sold, selling, general and administrative expenses, it is exempted from special items that can be impacted by big bath behavior of incoming CEOs (e.g. Murphy & Zimmerman, 1993). Market performance is measured as the stock market return (TSR) in year t+2. In the first equation, the coefficient β_1 denotes the salary and bonus elasticity for inside CEO successors, and the sum of coefficients ($\beta_1 + \beta_2$) represents salary and bonus elasticity for outside CEO successors. On the basis of the hypotheses, it is expected that $\beta_2 < 0$. Cash compensation is expected beforehand to be more strongly associated with differences in accounting performance than with market returns (Lambert & Larcker, 1987).

The provision of long-term incentives is measured through the elasticity of the unrealized value of the CEO equity portfolio wealth with respect to market returns and is described by the second equation as follows:

[34] Here, by measuring the change of cash compensation in logarithms instead of British pounds, the choice is made for an elasticity approach instead of a sensitivity approach. Main advantages of an elasticity approach is that it provides a better fit in the sense that rates of return explain more of the cross-sectional variation of the natural logarithm of Δ cash pay compared to shareholder value explaining variation in Δ cash pay, and that the elasticity approach has a straightforward interpretation. However, neither the sensitivity nor elasticity approach strictly dominates the other (Murphy, 1998). Moreover, the choice for measuring the independent variable of interest as the percentage change in firm value (Hall & Liebman, 1998) instead of dollar change in firm value (Murphy, 1990) boils down to measuring equity incentives from fractional ownership (i.e. higher fractional ownership implies stronger incentives) versus the acknowledgement that large dollar holdings of equity ownership can have powerful incentives despite small fractional ownership. Baker & Hall (2004) show that when actions of CEOs primarily affect dollar returns (e.g. perquisite consumption), the appropriate measure of CEO's incentives is fractional ownership. When actions of CEOs primarily affect percentage returns (e.g. new strategy implementation), the appropriate measure of CEO's incentives is the CEO's dollar holdings in the firm.

$$Ln(EqHold_t / EqHold_{t-1}) = \delta_0 + \delta_1 TSR + \delta_2 F\_OUTSIDER*TSR + \delta_3 F\_OUTSIDER + CONTROLS + \varepsilon \quad [2].$$

Prior research indicates that the majority of typical CEO incentives are driven by the variation in the value of the stock and stock option portfolio opposed to the CEO's flow compensation (Hall & Liebman, 1998; Core et al., 2003). The elasticity of the value of the CEO equity portfolio wealth with respect to market returns can be interpreted as the percentage increase in the unrealized value of equity portfolio holdings following a 1% increase in market returns. $Ln(EqHold_t / EqHold_{t-1})$ denotes the natural logarithm of the difference in the unrealized holdings of stock and stock options for the end of year t+2 relative to the end of year t+1. TSR is the market-based performance measure and denotes the percentage change in shareholder value. In the second equation, the coefficient δ_1 denotes the CEO portfolio wealth elasticity from stock and stock option revaluations for inside successors and the sum of coefficients ($\delta_1 + \delta_2$) represents the CEO portfolio wealth elasticity from stock and stock option revaluations for outside successors. Based on the hypotheses, it is expected that $\delta_2 > 0$. Measurement of control variables is discussed more in detail in the next section.

Besides the use of log-linear models as described above, the conventional approach to dealing with potential outliers in the CEO compensation literature is to employ robust regressions supplemental to OLS regression (Jin, 2002). Robust regression excludes observations with Cook's D > 1 and subsequently performs Huber iterations followed by biweight iterations.

3.3.3 Measurement of control variables

This section will briefly outline the firm-level variables and managerial characteristics included in the control function of the empirical models.

Economic determinants

Core et al. (1999) discern four main economic determinants that explain the design of compensation contracts. First, large firms require more talented managers who are more highly compensated (Smith & Watts, 1992) and are expected to be wealthier (Baker & Hall, 1998). If CEOs' utility functions exhibit declining absolute risk-aversion, CEOs of larger firms are expected to have greater dollar incentives from equity. Empirical studies indeed find that dollar incentives increase with firm size at a

decreasing rate (Baker & Hall, 1998; Himmelberg et al., 1999). SIZE represents firm size and is defined as the natural logarithm of the book value of total assets. Second, existing growth opportunities are expected to be positively associated with equity incentives. Growth options increase monitoring difficulty (Smith & Watts, 1992), and providing equity compensation lowers monitoring costs by providing managers with incentives to maximize shareholder value. Moreover, marginal product of effort increases with the fraction of firm value represented by growth options (Smith & Watts, 1992). The more valuable a CEO's effort, the higher the provision of incentives should be, holding everything else equal (Jin, 2002). Some empirical studies find the predicted positive relation between existing growth options and the degree to which firms use equity incentives to link top managers' wealth to firm value (Smith & Watts, 1992; Himmelberg et al., 1999). GROWTH denotes growth options and is defined as market value of equity divided by book value of equity. Third, Aggarwal & Samwick (1999) argue that firm risk is a main determinant of executive compensation. Firms that operate in less predictable or noisier environments display higher monitoring costs and so these CEOs will be awarded with relatively more incentives. However, risk-aversion of managers implies that the provision of incentives decreases with the noise in performance measures following standard agency predictions. RISK denotes firm total risk and is defined as the standard deviation of stock returns over five prior years (Core et al., 1999). The fourth economic determinant is firm performance which is included as a main variable of interest in the analyses.

Corporate governance

Some governance variables are included as control variables since various monitoring mechanisms substitute for the provision of incentives as a means to mitigate moral hazard problems (e.g. Core & Guay, 1999; Engel et al., 2002). When direct monitoring is more effective, fewer incentives are needed to motivate CEOs to work in the interest of the shareholders. An important monitoring mechanism to reduce agency problems is through the board of directors. I proxy for the effectiveness of monitoring by the board through four different measures that characterize the composition of the board. First, larger boards are assumed to be less effective (Jensen, 1993). BSIZE represents board size and will be defined as total number of directors on the board (He & Conyon, 2004). Second, CEOs exert more influence over internal

directors relative to outside directors (Core et al., 1999). OUTSBOARD reflects the proportion of outside directors on the board. Third, prior literature suggests that many directors serve on too many boards to adequately fulfill their supervisory duties. BUSYB represents busy boards and is defined as the proportion of outside directors that serve on four boards or more. Fourth, the agency problems are greater when a CEO is also the chairman of the board (Yermack, 1996). CEOCHAIR is an indicator variable equal to one if the CEO is also chairman of the board, zero otherwise. An additional monitoring mechanism is the presence of large shareholders (i.e. blockholders). It is expected that blockholders signal better monitoring quality which serves as substitute for equity incentives to alleviate moral hazard problems (He & Conyon, 2004). BLOCKLH represents the proportion of shares held by investors owning more than 5% of the firm's outstanding shares.

Other reasons for provision of incentive compensation

Prior literature furthermore indicates that loss-making firms and firms in financial distress may have different compensation structures (Gilson & Vetsuypens, 1993; Matejka et al., 2005). LOSS is an indicator variable equal to one if the firm has a negative shareholder return, zero otherwise. Free cash flow problems refer to shareholder concerns regarding CEOs' discretionary use of cash flows (e.g. consuming perquisites). Firms with high discretionary cash flows require incentive pay as a mitigating governance mechanism. FREECASH denotes the ratio of operating income to sales (Himmelberg et al., 1999).[35] Corporate debt may provide an alternative mechanism to align the interests of owners and managers in firms with potential conflicts about cash flow payout policies. Contractual payout commitments may mitigate shareholder concerns regarding CEOs' discretionary use of cash flows (Jensen, 1986). LEV denotes the firm's leverage and is defined as the book value of liabilities divided by book value of assets. Finally, with respect to managerial characteristics, AGE refers to the age of the CEO successor and GENDER is an indicator variable equal to one if the CEO is male, zero otherwise.

[35] Free cash flow can be defined as the operating cash flow minus capital expenditures, i.e. the cash that a firm is able to generate after cash outflows required to maintain or expand its asset base. The assumption is that free cash flow is correlated with operating income (Himmelberg et al., 1999).

Reasons for provision of stock-based compensation

Here additional reasons are distinguished in favor of providing incentives in the form of stock-based compensation versus cash-based compensation. Since restricted stock and stock options require no contemporaneous cash payouts, firms with cash constraints are expected to compensate CEOs with equity as a substitute for cash (Core et al., 2003). Besides the variable FREECASH, as a robustness analyses the variable CASHCONSTR is included, defined as the average over three years of [(common and preferred dividends + cash flow used in investing activities – cash flow from operations) / total assets] (Core & Guay, 1999; 2001). Moreover, two additional reasons are distinguished that explain the provision of stock-based compensation. First, stock and option grants can be due to tax motivations. US firms are not taxed upon granting the executive stock option, but at the exercise date. If tax rates are expected to be higher, future tax deduction from deferred compensation can be favorable relative to the immediate tax deduction received from cash compensation. So the use of stock-based compensation is expected to be less costly for firms with a low marginal tax rates (Core et al., 2003). However, the exercise-date difference between market and exercise price was treated as deductible compensation expense in the US, but not in the UK (Conyon & Murphy, 2000). Second, firms may substitute option compensation for other forms of compensation because of financial accounting treatment of stock options. Unlike other forms of compensation like cash compensation or restricted stock which are expensed on the income statement, the value of stock option grants is disclosed in the footnotes of the financial statements (Core et al., 2003). Thus, firms with earnings constraints are expected to grant more stock options (Core & Guay, 1999). In response to the 1995 Greenbury report however, the UK government tightened the restrictions on option awards, reducing the amount that could be awarded (Conyon & Murphy, 2000). To the extent that UK firms indeed make use of the limited scope for awarding stock options to circumvent earnings constraints, the variable LOSS controls for such behavior of poorly performing firms. Appendix 1 presents an overview of the variable definitions.

3.4 Empirical results

3.4.1 Summary statistics

Table 1, panel A and B reports descriptive statistics for both the full sample and by type of CEO succession (i.e. inside vs. outside CEO succession). Panel A shows that 35% of CEO successions can be classified as outside successions. This is comparable with prior studies that documented outside succession rates of about 30% (e.g. Huson et al., 2001; Murphy & Zabojnek, 2007). Firm size indicates that this sample is composed of larger firms listed on the LSE. The mean (median) sum of salary and bonus is about £390K (£280K). The mean (median) equity holdings are about £2.7 million (£1.6 million). These numbers are consistent with prior UK studies (e.g. Conyon & Murphy, 2000; Conyon et al., 2006).

Panel B reports descriptive statistics for the subsample of inside and outside successions and performs difference-tests based on simple t-tests and Wilcoxon rank-sum tests. First, outside successors receive slightly more salary and bonus, have significantly higher equity holdings, and are awarded higher total compensation relative to the inside successors. Second, outside successors show higher accounting performance changes and report lower free cash flows. This could imply that firms with deteriorating performance are more inclined to attract outside successors who consequently demonstrate the desired performance improvements (Parrino, 1997). Third, firms with outside CEO successors have a higher proportion of outsiders on the board and a higher percentage of shares are held by relatively large shareholders (i.e. blockholders). Prior research documented that outsider-dominated boards are more likely to select outside CEO successors (Borokhovich et al., 1996).

Table 1: Summary statistics

Panel A reports descriptive statistics for variables used in the analyses. Panel B reports descriptive statistics for those variables by the type of CEO succession. Panel C reports the composition of the sample over industries and years. Panel D reports the Pearson correlations for the variables used in the analyses. In panel B: [a] Significance levels based on t-test. [b] Significance levels based on Wilcoxon rank-sum (Mann-Whitney) test. In panel D: Pearson correlation coefficients are reported in the upper diagonal cells. The corresponding significance levels are reported in the lower diagonal cells. ***, **, * corresponds to 1%, 5%, and 10% significance levels (two-tailed).

Panel A: Descriptive statistics (full sample)

Variable	Mean	Std.Dev.	10%	25%	50%	75%	90%
SB	393.4	333.3	108.0	172.0	281.0	516.0	803.0
EquityHold.	2731.3	3171.6	375.0	682.0	1603.0	3482.0	6812.0
Ln(Comp)	6.414	1.342	4.585	5.493	6.703	7.364	8.022
F_Outsider	0.351	--	0.000	0.000	0.000	1.000	1.000
ΔROA	0.009	0.040	-0.045	-0.014	0.008	0.037	0.057
ΔIA_ROA	0.021	0.109	-0.055	-0.022	0.002	0.023	0.106
TSR	0.205	0.318	-0.202	0.037	0.207	0.391	0.542
Size	13.549	1.715	11.384	12.329	13.394	14.956	15.774
Growth	3.004	10.917	0.599	1.014	1.644	2.714	4.754
Risk	0.592	0.943	0.179	0.247	0.329	0.565	1.067
Bsize	8.901	2.366	6.000	7.000	9.000	10.000	12.000
OutsBoard	0.571	0.131	0.430	0.500	0.570	0.670	0.730
BusyB.	0.304	0.194	0.090	0.170	0.290	0.430	0.560
CeoChair	0.023	--	0.000	0.000	0.000	0.000	0.000
Blockh.	0.206	0.167	0.000	0.080	0.160	0.320	0.410
D_Loss	0.392	--	0.000	0.000	0.000	1.000	1.000
Leverage	0.595	0.224	0.331	0.468	0.589	0.702	0.859
FreeCash	0.024	0.569	0.006	0.033	0.072	0.124	0.189
Cashconstr.	-0.150	1.704	-0.084	-0.043	-0.006	0.028	0.062
Age	49.146	6.619	41.0	44.0	49.0	55.0	57.0
Gender	0.982	--	1.000	1.000	1.000	1.000	1.000

Panel B: descriptive statistics (by succession type)

	Inside CEO succession			Outside CEO succession			Difference tests	
Variable	N	Mean	Median	N	Mean	Median	Mean[a]	Median[b]
SB	111	368.3	257.0	60	440.1	358.5		**
EquityHold.	111	2400.7	1379.0	60	3342.8	2434.0	*	*
Ln(Comp)	111	6.201	6.510	60	6.809	6.862	***	**
ΔROA	111	0.001	0.004	60	0.022	0.022	***	***
ΔIA_ROA	111	0.008	-0.004	60	0.042	0.013	*	***
TSR	111	0.216	0.245	60	0.183	0.159		
Size	111	13.563	13.394	60	13.523	13.451		
Growth	111	3.835	1.776	60	1.466	1.381		*
Risk	111	0.575	0.331	60	0.625	0.324		
Bsize	111	9.108	9.000	60	8.517	9.000		
OutsBoard	111	0.555	0.570	60	0.599	6.000	**	**
BusyB.	111	0.302	0.270	60	0.310	0.315		
CeoChair	111	0.000	0.000	60	0.000	0.000		
Blockh.	111	0.187	0.140	60	0.243	0.230	**	***
D_Loss	111	0.369	0.000	60	0.433	0.000		
Leverage	111	0.578	0.583	60	0.625	0.599		
FreeCash	111	0.092	0.078	60	-0.103	0.057		***
Cashconstr.	111	-0.249	-0.004	60	0.031	-0.019		
Age	111	49.306	50.0	60	48.850	49.0		
Gender	111	1.000	1.000	60	0.950	1.000	*	**

Panel C: Sample composition over industries/years (full sample and by succession type)

Frequency of sample observations over *industries* for the full sample and by succession type

	Full sample	Inside CEO succession	Outside CEO succession
Mining & Construction (SIC: 10-19)	18 (11%)	15 (13%)	3 (5%)
Manufacturing (SIC: 20-39)	64 (37%)	38 (34%)	26 (43%)
Transportation (SIC: 40-49)	20 (12%)	13 (12%)	7 (12%)
Wholesale and retail trade (SIC: 50-59)	33 (19%)	18 (16%)	15 (25%)
Services (SIC: 70-89)	36 (21%)	27 (24%)	9 (15%)
Total	171 (100%)	111 (100%)	60 (100%)

Frequency of sample observations over *years* for the full sample and by succession type

	Full sample	Inside CEO succession	Outside CEO succession
1998	10 (6%)	9 (8%)	1 (2%)
1999	10 (6%)	3 (3%)	7 (12%)
2000	27 (16%)	21 (19%)	6 (10%)
2001	41 (24%)	25 (23%)	16 (27%)
2002	28 (16%)	20 (18%)	8 (13%)
2003	36 (21%)	22 (20%)	14 (23%)
2004	19 (11%)	11 (10%)	8 (13%)
Total	171 (100%)	111 (100%)	60 (100%)

Panel C reports the sample composition over industries and years. The sample seems to be somewhat concentrated in manufacturing (SIC: 20-39). Within manufacturing, the strongest concentrations defined at a 2-digit SIC level are: SIC: 20, Food & Kindred products (6%); SIC: 28, Chemicals and Allied Products (5%); and SIC: 36, Electronic, Electrical Equipment & Components, Except Computer Equipment (5%) (not tabulated). Also the sample composition is somewhat concentrated in the later years of the sample.

Panel D: Pearson correlation matrix

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. SB	1.00	.56	.45	.10	.12	.02	.21	.50	.34	-.11	.38	.38	.38	-.03	-.11	-.11	.16	.08	-.07	.16	.02
2. EquityHold.	***	1.00	.44	.16	.01	.15	.25	.51	.09	-.17	.35	.26	.35	-.08	-.08	-.05	.02	.09	-.12	.11	-.04
3. Ln(Comp)	***	***	1.00	.22	.08	-.03	.42	.25	.10	-.09	.17	.14	.18	-.05	-.07	-.04	.06	.04	-.09	.14	.05
4. F_Outsider		**	***	1.00	.25	.15	-.05	-.01	-.10	.03	-.12	.16	.02	.05	.16	.06	.10	-.16	.07	-.03	-.18
5. ΔROA	*			***	1.00	.21	-.03	-.14	-.20	.08	-.13	.01	-.00	-.01	.11	.01	.01	-.22	-.03	-.14	.05
6. ΔIA_ROA		*		*	***	1.00	.00	-.01	-.04	.15	.11	.07	.04	-.01	-.07	-.04	-.06	-.17	-.08	-.01	-.11
7. TSR	***	***	***				1.00	.10	-.02	-.05	.02	.02	.19	.01	-.03	.07	-.08	.08	-.08	.14	.08
8. Size	***	***	***		*			1.00	.01	-.29	.64	.16	.32	-.11	-.15	-.07	.09	.23	-.12	.33	.01
9. Growth	***				***				1.00	.02	.24	.12	.05	-.11	.00	.03	.06	.03	-.00	-.06	.01
10. Risk		**				**		***		1.00	-.10	-.02	-.05	.05	-.04	-.05	-.22	-.55	.02	-.18	.04
11. Bsize	***	***	**		*			***	**		1.00	.09	.21	-.07	-.09	-.04	.12	.05	-.13	.25	.11
12. OutsBoard	***	***	*	**				**				1.00	.38	.01	-.06	.09	.22	-.11	-.04	-.08	0.02
13. BusyB.	***	***	**				**	***			***	***	1.00	-.05	-.07	-.01	-.02	.02	-.09	-.03	-.01
14. CeoChair														1.00	..08	-.05	.10	.00	.00	.15	.02
15. Blockh.				**				**							1.00	.03	-.10	.06	.10	-.10	-.14
16. D_Loss																1.00	.02	-.02	-.10	.01	.11
17. Leverage	**									***		***					1.00	-.10	.18	.06	.05
18. FreeCash				**	***	**		***		***								1.00	-.07	.09	-.03
19. Cashconstr.											*						**		1.00	-.03	-.01
20. Age	**		*		*		*	***		**	***			**						1.00	.12
21. Gender				**											**						1.00

Panel D reports Pearson correlation coefficients. First, these univariate analyses suggest that board size, fraction of outsiders on the board, and the proportion of busy board members are positively and significantly associated with salary and bonus, value of equity holdings, and total CEO compensation awarded. Second, larger firms do award more salary and bonus, and total compensation to their CEOs, and their CEOs have larger equity holdings. Third, CEOs of firms with a higher stock market performance receive stronger incentives in the form of salary and bonus, the value of their equity holdings, and total compensation. Remarkably, growth options are not significantly associated with the provision of equity incentives, but are positively related with the provision of salary and bonus. Consistent with prior literature however, the firm's riskiness, measured as the standard deviation of stock returns, is negatively and significantly associated with the provision of equity incentives to CEOs.

3.4.2 Provision of short-term incentives to outsiders vs. insiders

Table 2 reports regression estimates for the empirical model described by equation (1). OLS and robust regression are performed where OLS t-statistics are based on clustered standard errors adjusted for heteroskedasticity and autocorrelation (Petersen, 2008). The provision of short-term incentives is measured through the salary and bonus elasticities with respect to both stock market performance and accounting performance. Panel A examines the impact of market performance on the change in CEOs' cash compensation. Overall it seems that stock market performance is not significantly associated with cash compensation. Only for the OLS regression, stock market performance is significantly associated with cash compensation. Here a 10% market return corresponds with a 3.5% increase in cash compensation for outside CEO successors. The lack of significant results coincides with prior evidence that suggests that cash compensation is commonly tied to earnings rather than market performance (Lambert & Larcker, 1987). Moreover, that cash compensation is tied to stock market performance only for outsiders coincides with findings of Dikolli et al. (2007) who document that firms make annual bonus contracts contingent on forward-looking measures (price) to lengthen the decision horizon of CEOs as they approach retirement (an alternative proxy for horizon concerns). As robustness analysis, the analysis is repeated allowing the salary and bonus elasticity with respect to market performance to vary across governance variables. This is consistent with previous

literature documenting variation in the implicit weight on performance measures across governance structures (Davila & Penalva, 2006). Market performance is again not significantly associated with cash compensation. With respect to control variables, the results suggest amongst others that monitoring by large shareholders can be regarded as substitute rather than complement for the provision of incentives tied to performance measure outcomes (Engel et al., 2002). The coefficient on the interaction between TSR and blockholders is negative and significant for the robust regression ($p<0.1$). Moreover, the coefficient on the interaction between TSR and board size is negative and significant ($p<0.1$). This reduction in CEO performance incentives provided by the board through compensation can follow from the reduced ability of larger boards to resist CEO control (Eisenberg et al., 1998)

Panel B of Table 2 describes the regression estimates of regressing the change in cash compensation on the change in accounting performance. Here, accounting performance is positive and more strongly associated to a change in CEO salary and bonus for inside successors, relative to outside successors. The coefficient that represents the relationship between the change in ROA and CEO salary and bonus for inside CEO successors (β_1) is positive and significant for both the OLS regression and the robust regression. The coefficient is higher in comparison with prior studies. For his sample of US CEOs over the period 1981-1984, Kaplan (1994) reported coefficients of about 2. Since the median ROA for sample firms is about 6%, a 10% increase in ROA (i.e. an increase of the ROA with 0.6% towards 6.6%) results in a 3% increase in salary and bonus for inside CEO successors. Formulated in absolutes, this implies a salary and bonus increase for inside CEO successors of about £8K (evaluated at the median salary and bonus for inside successors). The relationship between accounting performance and the sum of salary and bonus is significantly smaller for outside CEO successors (β_2). The relationship between the change in ROA and the change in salary and bonus for outside CEO successors is positive and significant for both the OLS and robust regression as suggested by the F-test of the sum of coefficients. Starting from a median ROA of 6%, an increase of ROA towards 6.6% (i.e. a 10% increase in ROA) results in a 1% increase in CEO's cash compensation. Formulated in absolute amounts, this implies an increase in salary and bonus for outside successors of almost £4K (evaluated at the median salary and bonus for outside CEO successors).

The analyses are repeated allowing the implicit weights on the performance measures to vary across governance structures (Davila & Penalva, 2006). This does not change the basic findings. Still the salary and bonus elasticity with respect to accounting performance is significantly greater for inside CEO successors compared to outside CEO successors. The results moreover suggest that monitoring by large shareholders acts as a substitute for the provision of incentives tied to accounting measures since the coefficient on the interaction between ΔROA and blockholders is negative and significant for the robust regression ($p<0.05$).

I furthermore repeat the analyses using the change in operating income divided by total sales (ROS) as measure for accounting performance. The results are similar with respect to sign and magnitude of the coefficients and corresponding significance levels. Also, the change in industry-adjusted operating income divided by the book value of total assets is used as proxy for performance. Here the sign of coefficients remains unchanged, but the magnitude and corresponding significance levels of the coefficients decrease sharply (not tabulated). This coincides with prior literature about CEOs being rewarded for industry-wide or market-wide factors beyond their control (Abowd & Kaplan, 1999). Overall, these analyses suggest that inside CEO successors are more strongly incentivized by means of salary and bonus tied to short-term oriented accounting measures compared to outside CEO successors. The goodness-of-fit measure is about 32% and the regression models examining the relationship between accounting performance and compensation are highly significant ($p<0.01$).

Table 2: Provision of short-term incentives to CEO successors

This table reports the regression estimates of the following model:

$$Ln(SB_t/SB_{t-1}) = \beta_0 + \beta_1 PERF_t + \beta_2 F\_OUTSIDER*PERF_t + \beta_3 F\_OUTSIDER + CONTROLS + \varepsilon$$

PERF is represented by stock market performance (TSR) and accounting performance (ΔROA). The results of two regressions are reported: ordinary least squares (OLS) and robust regressions. The test-statistics are reported in parentheses. Test-statistics for OLS regression are based on clustered standard errors taking into account heteroskedasticity and autocorrelation. The goodness-of-fit measure that is reported is the R-squared (OLS). All regressions include indicator variables to capture both year- and industry effects. ***, **, * denotes 1%, 5%, and 10% significance levels respectively (one-tailed when coefficient sign is predicted, two-tailed otherwise).

Panel A: Stock market performance

		Dependent variable: $Ln(SB_t/SB_{t-1})$							
		OLS regression				Robust regression			
Variables	Pred.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Intercept		0.67**	2.19	0.67**	2.11	0.47	1.44	0.63*	1.86
TSR_t	+	0.12	1.15	0.34	0.87	-0.06	-0.83	0.50	1.19
TSR_t*F_Outsider	–	0.24	1.38	0.24	1.31	0.27	1.28	0.22	1.01
F_Outsider		-0.02	-0.30	-0.02	-0.26	0.00	0.06	0.03	0.41
Size		-0.00	-0.20	-0.01	-0.31	-0.02	-0.86	-0.03	-1.43
Growth		-0.00	-0.48	-0.00	-0.48	-0.02	-0.84	-0.00	-0.60
Risk		-0.01	-0.30	-0.01	-0.48	-0.01	-0.32	-0.02	-0.55
Bsize		0.01	0.30	0.02	1.15	0.02	1.43	0.04**	2.49
OutsBoard		-0.34	-1.65	-0.37	-1.54	0.10	0.52	0.03	0.41
BusyB.		0.00	0.03	-0.03	-0.16	0.02	0.14	-0.13	-0.78
CeoChair		0.33**	2.09	0.12	0.91	0.09	0.56	-0.06	-0.26
Blockh.		-0.07	-0.42	0.01	0.06	-0.11	-0.76	0.00	0.02
D_Loss		-0.04	-0.59	-0.03	-0.38	-0.05	-0.95	-0.07	-1.27
Leverage		0.12	1.02	0.12	1.06	0.03	0.30	0.01	0.008
FreeCash		-0.07**	-2.02	-0.07**	-2.16	-0.04	-0.77	-0.04	-0.79
Age		-0.01	-1.54	-0.01*	-1.74	-0.00	-1.22	-0.01*	-1.81
Gender		-0.01	-0.11	0.00	0.01	-0.05	-0.28	-0.03	-0.18
Cashconstr.		-0.00	-0.44	-0.01	-0.59	0.00	0.13	0.00	0.09
TSR_t*Bsize		--	--	-0.07*	-1.78	--	--	-0.06*	-1.92
TSR_t*OutsBoard		--	--	0.63	1.02	--	--	0.07	0.12
TSR_t*BusyB		--	--	-0.02	-0.04	--	--	0.65	1.50
TSR_t*CeoChair		--	--	0.88	1.31	--	--	1.43*	2.02
TSR_t*Blockh.		--	--	0.28	-0.49	--	--	-0.91*	-1.86
Industry dummies		Yes		Yes		Yes		Yes	
Year dummies		Yes		Yes		Yes		Yes	
F-test ($\gamma_1 + \gamma_2 = 0$)	+	5.76***		1.49		1.08		2.10*	
N		171		171		171		171	
Goodness-of-fit		0.15		0.18		--		--	
F-value		1.78**		2.13***		0.90		1.26	

Panel B: Accounting performance

		Dependent variable: $Ln(SB_t/SB_{t-1})$							
		OLS regression				Robust regression			
Variables	Pred.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Intercept		0.16	0.51	0.16	0.45	0.47	1.32	0.61*	1.68
ΔROA_t	+	5.05***	4.80	4.44***	3.13	4.25***	5.24	7.26**	1.93
ΔROA_t*F_Outsider	–	-3.04***	-2.42	-2.47**	-1.76	-2.56**	-1.87	-2.11*	-1.47
F_Outsider		-0.02	-0.40	-0.01	-0.12	-0.05	-0.83	-0.05	-0.83
Size		-0.00	-0.04	-0.00	-0.19	-0.02	-0.12	-0.02	-1.12
Growth		0.00	1.23	-0.00	-0.09	0.00	0.25	-0.00	-0.09
Risk		0.02	0.68	0.02	0.56	-0.01	-0.21	-0.02	-0.71
Bsize		0.00	0.31	0.01	0.91	0.01	0.94	0.03*	1.66
OutsBoard		-0.16	-0.75	-0.12	-0.51	0.01	0.03	0.01	0.05
BusyB.		0.00	0.01	0.01	0.09	-0.02	-0.12	0.00	0.01
CeoChair		0.24**	1.98	0.17	1.56	0.21	1.28	0.19	1.10
Blockh.		-0.08	-0.53	-0.07	-0.52	-0.13	-0.85	-0.14	-0.92
D_Loss		-0.04	-0.77	-0.05	-0.87	-0.03	-0.63	-0.04	-0.77
Leverage		0.07	0.64	0.06	0.45	-0.05	-0.40	-0.12	-0.92
FreeCash		-0.01	-0.22	-0.00	-0.02	-0.02	-0.44	-0.01	-0.27
Age		0.00	0.004	-0.00	-0.23	-0.00	-0.60	-0.00	-0.68
Gender		-0.04	-0.35	0.00	0.01	-0.05	-0.25	-0.07	-0.38
Cashconstr.		0.01	1.17	0.01	1.11	0.01	0.93	0.02	1.28
ΔROA_t*Bsize		--	--	0.05	0.23	--	--	0.04	0.16
ΔROA_t*OutsBoard		--	--	-8.12	-1.23	--	--	-1.78	-0.28
ΔROA_t*BusyB		--	--	-3.04	-0.81	--	--	-2.33	-0.59
ΔROA_t*CeoChair		--	--	1.59	0.49	--	--	1.33	0.27
ΔROA_t*Blockh.		--	--	-3.16	-0.77	--	--	-6.72**	-2.03
Industry dummies		Yes		Yes		Yes		Yes	
Year dummies		Yes		Yes		Yes		Yes	
F-test ($\gamma_1 + \gamma_2 = 0$)	+	9.39***		5.89***		2.36*		1.51	
N		171		171		171		171	
Goodness-of-fit		0.32		0.35		--		--	
F-value		2.93***		3.07***		1.88***		1.87***	

3.4.3 Provision of long-term incentives to outsiders vs. insiders

Table 3 reports regression estimates for the empirical model represented by equation (2). Here the provision of long-term incentives is measured through the elasticity of the value of unrealized equity holdings with respect to market performance. For both regressions, the association between stock market performance and the change in the value of equity holdings for both inside and outside CEO successors are positive and significant. Also, the coefficient that represents the differential impact of market performance on the change in equity holdings for outside successors (δ_2) is positive and significant. This implies that the compensation of outside CEO successors is more strongly tied to market performance compared to inside CEO successors. A 10% increase in stock market performance results in an increase in the value of CEO wealth of about 3% for inside CEO successors. In absolute amounts, a 10% increase in stock market performance results in an increase in the value of CEO wealth of about £42K for inside CEO successors (evaluated at the median portfolio of equity for inside successors). However, a 10% increase in market performance results in a portfolio wealth change for outside CEO successors of about 6%. Thus a 10% increase in stock market performance implies an increase in the equity portfolio of about £145K for outside successors (evaluated at the median value of equity incentives for outside CEO successors). As robustness analyses, the analyses are repeated allowing implicit weights on market performance to vary across governance structures (Davila & Penalva, 2006). Besides that, the magnitude of the elasticity for inside CEO successors becomes somewhat bigger, while the sign and magnitude of the coefficients of interest as well as corresponding significance levels remain similar.

Table 3: Provision of long-term incentives to CEO successors

This table reports the regression estimates of the following model:

$$Ln(EqHold_t/EqHold_{t-1}) = \delta_0 + \delta_1 TSR + \delta_2 F\_OUTSIDER*TSR + \delta_3 F\_OUTSIDER + CONTROLS + \varepsilon$$

Results of two regressions are reported: ordinary least squares (OLS) and robust regressions. The test-statistics are reported in parentheses. Test-statistics for OLS regression are based on clustered standard error, taking into account heteroskedasticity and autocorrelation. The goodness-of-fit measure reported is the R-squared (OLS). All regressions include indicator variables that capture both year- and industry effects. ***, **, * denotes 1%, 5%, and 10% significance level respectively (one-tailed when coefficient sign is predicted, two-tailed otherwise).

		Dependent variable: Ln($EqHold_t$ / $EqHold_{t-1}$)							
		OLS regression				Robust regression			
Variables	Pred.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Intercept		1.05***	2.69	1.07***	3.04	0.99**	2.33	1.07**	2.41
TSR_t	+	0.32***	4.30	0.61**	1.84	0.29***	5.93	0.59**	2.12
TSR_t*F_Outsider	+	0.31**	1.96	0.23**	2.29	0.34***	2.46	0.35***	2.46
F_Outsider		-0.04	-0.51	-0.08	-1.03	-0.04	-0.46	-0.06	-0.71
Size		-0.04*	-1.87	-0.05**	-2.13	-0.04	-1.54	-0.05*	-1.75
Growth		-0.00	-0.76	-0.00	-0.85	-0.00	-0.95	-0.00	-0.78
Risk		-0.02	-0.49	-0.02	-0.51	-0.03	-0.65	-0.02	-0.58
Bsize		0.01	0.64	0.02	1.20	0.00	0.55	0.02	0.83
OutsBoard		-0.11	-0.40	-0.21	-0.91	-0.13	-0.53	-0.20	-0.72
BusyB.		-0.14	-0.90	0.06	0.31	-0.07	-0.42	0.05	0.24
CeoChair		-0.26**	-2.17	-0.09	-0.85	-0.25	-1.14	-0.12	-0.42
Blockh.		0.18	1.06	0.12	0.60	0.21	1.17	0.18	0.75
D_Loss		0.00	0.13	0.04	0.50	-0.02	-0.24	0.00	0.10
Leverage		-0.08	-0.58	-0.07	-0.54	-0.04	-0.30	-0.05	-0.32
FreeCash		-0.08	-1.41	-0.09*	-1.89	-0.09	-1.40	-0.09	-1.43
Age		-0.00	-0.41	-0.00	-0.38	-0.00	-0.46	-0.00	-0.56
Gender		0.06	0.54	0.03	0.26	0.06	0.29	0.06	0.27
Cashconstr.		-0.00	-0.43	-0.01	-1.02	-0.00	-0.34	-0.01	-0.47
TSR_t*Bsize		--	--	-0.04*	-1.80	--	--	-0.04	-1.68*
TSR_t*OutsBoard		--	--	0.27	0.57	--	--	0.09	0.21
TSR_t*BusyB		--	--	-0.37	-1.21	--	--	-0.18	-0.63
TSR_t*CeoChair		--	--	-0.40*	-1.93	--	--	-0.36	-0.73
TSR_t*Blockh.		--	--	0.20	0.72	--	--	0.11	0.35
Industry dummies		Yes		Yes		Yes		Yes	
Year dummies		Yes		Yes		Yes		Yes	
F-test ($\delta_1+\delta_2 = 0$)	+	20.63***		6.90***		23.33***		8.26***	
N		171		171		171		171	
Goodness-of-fit		0.41		0.45		--		--	
F-value		4.05***		6.54***		3.28**		2.99***	

The results furthermore suggest that larger boards are associated with smaller incentives tied to stock market outcomes ($p<0.1$). This is consistent with the intuition that the reduced ability of larger boards to resist CEO control leads to smaller CEO performance incentives provided by the board through compensation (Eisenberg et al., 1998). The goodness-of-fit measure is about 41% and the regression models are highly significant ($p<0.01$).[36]

In sum, one can conclude that the compensation of inside CEO successors is more strongly tied to short-term accounting measures (i.e. current earnings-based bonuses) while compensation of outside successors is more strongly tied to long-term oriented performance measures such as price and future earnings targets).

3.4.4. Robustness analyses

3.4.4.1. Incentive bounds as alternative explanation for cash pay elasticity differential

Table 2 shows that cash compensation for inside CEO successors is more strongly tied to accounting performance relative to outside successors. However earnings-based bonus plans often contain lower and upper bounds suggesting a reduced elasticity of cash pay for either very good or very bad earnings performance (Leone et al., 2006). More specifically, in this setting the documented smaller elasticity for outside CEO successors could be due to very bad earnings performance by those successors in the prior year, very good earnings performance in the current year, or equivalently formulated, a very large increase in earnings performance for the current year. At first glance, the performance in terms of ROA for year t+1 and year t+2 is not significantly different between inside and outside CEO successors (not tabulated). However, as suggested by panel B of Table 2, outside CEO successors report a significantly higher ΔROA compared to inside successors. The analyses are repeated while: i) excluding all observations with prior year ROA < 0%, 0.5%, 1%, 1.5% and 2% successively; ii) excluding all observations with current year ROA > 20%, 18%, 17%, 16%, and 15% successively; and iii) excluding all observations with ΔROA > 9%, 8.5%, 8%, 7.5%, and 7% successively. Results remain qualitatively similar with respect to sign, magnitude and significance levels for both the coefficients β1 and β2 (not tabulated).

[36] With respect to the control variables, significant coefficients for the variable 'CeoChair' indicate that the combination of the roles of CEO and chairman of the board is associated with decreased long-term incentives. However, these results must be interpreted with some caution because of limited variation in this variable. Moreover, the results do not appear to be significant for the robust regressions.

3.4.4.2. Equity valuation

In the analyses, the Black-Scholes value of options is used. Hall & Murphy (2002) claim that for the benefits of stock options (i.e. selection, retention, and provision of incentives) to materialize, the firm must set restrictions on actions of recipients such as short-selling company securities or otherwise hedging firm stock-price risk. However, restricting such trading and hedging activities creates a divergence between the (opportunity) cost of the option (i.e. foregone receipts of the sale of a tradable and hedge-able stock option to an outside investor) and the stock option value to a risk-averse and undiversified executive who can neither sell the option nor hedge against its risks.[37] Since options are routinely exercised relatively early in their term (Huddart & Lang, 1996), relaxing the assumption that executives hold their options until expiration date (i.e. early exercise provisions upon vesting) decreases the divergence between the economic cost and the value of the option to executives.[38] Core & Guay (2001) argue that the discount on valuation is driven by the constraint for an executive to rebalance his portfolio following an equity grant, such that the equity grant permanently increases risk and incentives borne by the executive. If one assumes that firms contract with executives to hold a specific amount of equity incentives (i.e. agree upon a specified level of risk) and executives are required to rebalance portfolios when equity risk deviates from contractual levels, the equity grant - which now serves as compensation instead of serving as both incentive and compensation - does not increase risk and executives do not discount the value of the grant.[39] Further, prior literature has reported subjective valuations of stock options by employees that

[37] The risk-neutrality assumption central to the Black-Scholes model assumes that since investors are able to hedge, options can be valued as if investors were risk-neutral and all assets appreciate at the risk-free rate. Then the value of options can be estimated by computing the expected option value upon exercise assuming that the expected stock return equals the risk-free rate. The expected option value to the grant date is then computed through discounting using the risk-free rate (Hall & Murphy, 2002).

[38] Allowing early exercise increases option values to undiversified executives since sufficiently high stock prices lead executives to lock in the gain (i.e. exercise and sell the shares) instead of holding the option for another period (i.e. sacrifice upside potential in stock prices and deferred payment of exercise prices). The economic cost of options decreases since executives' exercise decisions are suboptimal from the point of view of outside investors (i.e. early exercise essentially removes the right-hand tail of payoffs).

[39] As illustration, Core & Guay (2001) use an example where an executive must hold $10 mio of his wealth in the firm's stock. Assume the executive receives a $1 mio grant and that at the time of the grant portfolio holdings cannot be rebalanced. Now he has $11 mio in firm equity, which imposes additional risk and incentives on the executive and moves him away from preferred holdings. So, he discounts the value of this $1 mio grant. Now assume that a contract between executive and firm requires him to hold exactly $10 mio of equity incentives. If the executive receives a $1 million grant and if he can rebalance his portfolio, he will not discount the value of the grant (since the executive can sell $1 mio of his existing holdings and still maintain his contracted level of firm equity).

contrast conventional wisdom about employees putting a discount to the Black-Scholes value of an option (e.g. Devers et al., 2007). One reason for the documented subjective overvaluation compared to the Black-Scholes benchmark is employee optimism regarding stock price expectations, consistent with the view that stock options serve to attract optimistic employees from the labor pool (Arya & Mittendorf, 2005).

Moreover, since option vesting and other forms of equity compensation are conditional on achieving longer-term performance targets, the probability of stock option vesting, the vesting of restricted stock grants, etc., is strictly smaller than one. Conyon et al. (2006) report a vesting probability of performance-based equity compensation of about 80%. To address aforementioned issues, different discount rates are applied to: i) the valuation of options;[40] and ii) the valuation of equity compensation where vesting is made conditional on achieving longer-term performance targets. Re-estimating the regressions specified in equation (2) while applying discount rates of 60%, 70%, 80%, and 90% respectively yields qualitatively similar results with respect to sign, magnitude and significance levels for the main coefficients of interest.

3.4.4.3 Potential endogeneity of choice regarding CEO successor

That the decision to select an inside versus outside CEO successor represents a choice variable is itself not sufficient to warrant concerns for endogeneity (Chenhall & Moers, 2007). From an econometric point of view endogeneity can be defined as the correlation between the disturbance term in the structural equation and one or more explanatory variables, potentially caused by omitted variables (Nikolaev & van Lent, 2005). This results in biased coefficients if an omitted variable is correlated with both the explanatory variable of interest as well as with the explained variable (Chenhall & Moers, 2007). One source of econometric endogeneity is self-selection, where an omitted unobservable variable may for instance affect the way in which observations are categorized within the sample (Nikolaev & van Lent, 2005). Since firms that select outside CEO successors may differ from firms that select inside CEO successors in more respects than their CEO successor preference, the focus is on

[40] Assuming risk aversion parameters between two and three; and investments of their wealth in the firm's stock between 50% and 67%, Hall & Murphy (2002) find discount rates ranging between 63% and 84%.

omitted variables causing firms to self-select into attracting outside successors also potentially associated with the provision of incentives.

3.4.4.3.1. The control function approach

The control function approach addresses selection on observables, i.e. the possibility that an observable variable z that determines the treatment dummy D (here the choice to select an insider or outsider as CEO successor) may be correlated with the outcome. The control function approach implies expanding the original set of explanatory variables **x** with z to expunge the possible correlation between the error term in the outcome equation and z (Cameron & Trivedi, 2005). So when prior theory is used to assess whether endogeneity warrants concern (Chenhall & Moers, 2007), poor pre-turnover performance is identified as an important determinant for outside succession (Parrino, 1997; Engel et al., 2003; Farrell & Whidbee, 2003). First, F_OUTSIDER is regressed on pre-turnover accounting performance and stock market performance respectively. The results indicate that poor ROA, negative changes in ROA, and negative market returns are associated with outside CEO succession (not tabulated). To examine the potential impact on regression results, first note that regression equations 1 and 2 include a proxy for loss-making firms to control for potentially different executive compensation structures in loss-making firms. Moreover, prior research indicates that loss-making firms decrease their emphasis on providing explicit incentives (Leone et al., 2006; Matejka et al., 2005).[41] This biases against finding significant results for Table 3, but provides an alternative explanation for the results reported in Table 2. Thus, the model specified in equation (1) is re-estimated while controlling for: i) negative ROA for the two years prior to CEO succession; ii) negative industry-adjusted ROA for the two years prior to CEO succession; iii) negative changes in ROA for the two years prior to CEO succession; and iv) negative changes in industry-adjusted ROA for the two years prior to CEO succession respectively. For both OLS with clustered standard errors and robust regressions, the results remain qualitatively similar with respect to sign, magnitude and significance levels for both the coefficients β_1 and β_2 (not tabulated). Previous literature also identified that insider-dominated boards are less likely to recruit from outside the firm (Borkohovich et al., 1996) and that large firms characterized by greater management

[41] Prior research reported no significant link between cash compensation and earnings when earnings are negative (Leone et al., 2006), and a decreased emphasis on earnings and a greater use of subjectivity in a performance evaluation setting when making losses (Matejka et al., 2005).

depth and business unit structures (opposed to functional structures) are less inclined to select outside CEO successors. Proxies for firm size and board composition are already included in the control function, however.

3.4.4.3.2. Propensity score matching

An alternative method to address any potential selection on (un)observables is propensity score matching. Propensity score matching is said to mimic the random assignment in an experimental setting through the ex-post construction of a control group, i.e. identifying a comparison group that is similar to the treatment group with only one key difference: the comparison group did not participate in the treatment (i.e. did not select an outside CEO successor). To address potential endogeneity originating from selection on observables (also referred to as 'overt bias'),[42] a full-dimensional matching is employed where each firm that attracts an outside CEO is matched to one or more firms that are selected from the pool of sample firms that attract inside CEO successors. If firms that attract inside or outside CEO successors share the same pre-treatment characteristics, any difference in outcome can be attributed to the treatment (i.e. the selection of an insider or outsider as CEO successor). As it is difficult to match on a high-dimensional vector of covariates, matching occurs on the propensity scores defined as the probability of selecting an inside versus outside CEO successor conditional on the observed covariates. So for each firm that attracts an outside CEO successor, one or more firms compose a control group that has a similar distribution of observed variables and thus a similar probability of attracting an outside CEO successor.

The first step is to estimate the propensity score model by means of a logit model.[43] The control variables used in prior analyses are supplemented with an indicator variable equal to one if in the year prior to CEO succession the ROA of the respective firm < 0, zero otherwise (D_ROA_-1).[44] Here it is necessary to assume that: i) selection into treatment is on observables only such that unobservables play no role in the treatment assignment and outcome determination (an assumption that is relaxed

[42] Rosenbaum (2002) defines overt bias as the bias that is related to observable variables. This can either result from omitting some variables or from specifying an improper functional form for the relationship (Armstrong et al., 2008).
[43] Estimating the propensity score model through a probit model results in similar inferences.
[44] In this way the propensity score model contains a rich set of variables identified by previous literature as relevant for modeling the treatment-participation decision (Smith & Todd, 2001).

later); and ii) the common support condition which states that firms with similar covariates have positive probability of being both participants and non-participants into the treatment (i.e. perfect predictability of treatment given the observed covariates is ruled out). This common support condition is implemented by removing all observations in the treatment group where the propensity score is smaller than the minimum and larger than the maximum in the control group.[45] The results reported in panel A of Table 4 for both models are generally consistent with previous studies. Outside CEO succession follows poor pre-turnover performance (e.g. Parrino, 1997) and subsequently leads to post-turnover performance improvements (Huson et al., 2004). Prior literature furthermore argues that insider-dominated boards are less likely to recruit from outside (Borokhovich et al., 1996). Likewise, the results indicate that firms with larger boards and firms characterized by monitoring by large shareholders are more inclined to select outside CEO successors. However, in contrast to prior literature reasoning that larger firms characterized by greater management depth and business unit structures (opposed to a functional structure) are less inclined to attract from outside the firm (Agrawal et al., 2005), these results indicate that firm size is positively associated with outside CEO succession.

The second step is to match individual treatment firms to one or more firms selected from the pool of sample firms that attract inside CEO successors. To improve robustness of the findings, two different matching algorithms are employed. The first matching algorithm is nearest-neighbor matching with a radius caliper of 0.4. Here, each observation from the treatment group is matched with all observations from the control group where the propensity scores are within the predetermined tolerance region (i.e. the caliper) such that 'bad matches' are avoided.[46] The second matching algorithm is a kernel-based matching where each individual observation from the treatment group is matched to a weighted sum of observations from the control group with similar propensity scores, where the greatest weight is given to the observation with a propensity score closest to the score of the respective observations from the treatment group.

[45] Imposing common support can reduce bias of propensity score matching (measured against a benchmark of randomized experiments) (Smith & Todd, 2001).
[46] We use a caliper size of one quarter of the standard deviation of propensity scores (Rosenbaum & Rubin, 1985). Moreover, Smith & Todd (2001) demonstrate that increasing the number of nearest-neighbors can reduce bias of propensity score matching (measured against the benchmark of a randomized experiment).

Table 4: Robustness analyses – Propensity score matching

Panel A reports the regression estimates of two propensity score models where the propensity score is defined as the conditional probability of receiving treatment (i.e. selecting an outsider or insider as the CEO successor) given the observable covariates. The propensity score model is estimated by means of a logit model. Panel B provides insight into the quality of matching through a two-sample t-test of the observable covariates between the treatment and control group. Panel C reports the outcomes for both the treatment (outside CEO succession) and control group (inside CEO succession) and the sensitivity of the outcomes for hidden bias. ***, **, * denotes 1%, 5%, and 10% significance level respectively (two-tailed).

Panel A: Propensity score model

	Dependent variable: F_Outsider			
	Short-term incentives (equation 1)		Long-term incentives (equation 2)	
Variables	Coeff.	z-statistic	Coeff.	z-statistic
Intercept	-6.28***	-2.62	-6.05**	-2.51
ΔROA	11.50**	2.35	--	--
TSR	--	--	-0.06	-0.19
Size	0.36**	2.11	0.33*	1.95
Growth	-0.00	-0.20	-0.02	-0.75
Risk	-0.19	-0.62	-0.25	-0.79
Bsize	-0.24**	-2.14	-0.25**	-2.24
OutsBoard	2.07	1.29	2.27	1.43
BusyB.	-0.87	-0.78	-0.84	-0.76
Blockh.	2.15*	1.92	2.61**	2.30
D_Loss	0.29	0.78	0.34	0.92
Leverage	0.95	0.98	1.26	1.27
FreeCash	-0.69	-0.97	-1.04	-1.12
Age	0.01	0.32	0.01	0.46
D_ROA_-1	1.60***	2.85	1.56***	2.82
N	171		171	
Pseudo-R^2	0.17		0.16	
Wald chi-square	38.15***		35.13***	

Panel B: Two-sample t-test between treatment and control group

	Short-term incentives (equation 1)			Long-term incentives (equation 2)		
	Mean treatment	Mean control	Difference test (p-value)	Mean treatment	Mean control	Difference test (p-value)
ΔROA	0.02	0.02	0.84	--	--	--
TSR	--	--	--	0.19	0.18	0.92
Size	13.62	13.88	0.43	13.60	13.53	0.85
Growth	2.32	2.20	0.92	2.27	2.88	0.54
Risk	0.51	0.53	0.85	0.50	0.52	0.83
Bsize	8.47	8.63	0.72	8.49	8.49	0.99
OutsBoard	0.59	0.58	0.69	0.59	0.61	0.51
BusyB.	0.31	0.31	0.88	0.31	0.32	0.75
Blockh.	0.25	0.29	0.28	0.25	0.27	0.54
D_Loss	0.42	0.37	0.58	0.42	0.41	0.91
Leverage	0.61	0.60	0.89	0.60	0.57	0.43
FreeCash	0.07	0.08	0.54	0.06	0.06	0.97
Age	48.92	49.10	0.87	49.01	48.77	0.79
D_ROA_-1	0.25	0.17	0.30	0.26	0.26	0.94

An Epanechikov kernel is used that only uses observations from the control group within a predetermined tolerance region in order to avoid bad matches. All matching is done with replacement. The third step is to assess the quality of the matching. Covariate balance is achieved if both the treatment and control group appear similar along their observed dimensions except for the origin of the CEO successor (i.e. inside or outside CEO successor). In this respect, a two-sample t-test is performed to assess whether there are significant differences in the covariate means for both groups (Rosenbaum & Rubin, 1985). After matching, covariates should be balanced between both groups and therefore no significant differences should be found. Panel B of Table 4 reports results for nearest-neighbor matching (kernel-based matching leads to similar inferences with regard to the significance levels).

The p-values (two-tailed) indicate that the matching algorithm was successful in achieving balance, i.e. subsequent to the matching no significant differences exist between the treatment and control group for all included covariates.

Panel C of Table 4 presents the main results for the relationship between performance and pay for outside versus inside successors.[47] The dependent variables (natural logarithm of cash ratio and the natural logarithm of the ratio of unrealized equity holdings) can now be compared between treatment (outside CEO succession) and control group (inside CEO succession) while keeping in mind that the treatment and control group are similar with regard to the other remaining covariates. Although tests suffer from a loss in power due to the decreased number of observations, the results show that a similar change in ROA leads to significantly smaller change in the CEO cash compensation for outside CEO successors relative to inside CEO successors ($p<.05$). Furthermore, a similar change in stock market performance results in a significantly greater change in CEO wealth for outside CEO successors compared to inside successors ($p<.06$). Both results are based on nearest-neighbor matching. The use of kernel-based matching leads to similar results in terms of sign and significance levels. Therefore the results of this robustness analysis are consistent with the prior results in the sense that outsiders seem to be provided less short-term oriented incentives and more long-term oriented incentives relative to inside CEO successors.

Finally, the assumption is relaxed that selection into treatment is on observables only. The hidden bias is present if two units with the same observed covariates **x** have a different probability of receiving the treatment (π), i.e. if $\mathbf{x}_j = \mathbf{x}_k$, but $\pi_j \neq \pi_k$ for some j and k. The sensitivity analysis provides insight into the question how large these hidden biases should be to alter the inferences about treatment effects. More specifically, let us assume two units j and k characterized by $\mathbf{x}_j = \mathbf{x}_k$, but $\pi_j \neq \pi_k$. The odds that units j and k receive treatment is $\pi_j / (1 - \pi_j)$ and $\pi_k / (1 - \pi_k)$ respectively, and the odds ratio is the ratio of these odds.

[47] Propensity score matching was implemented through the Stata module psmatch2 (E. Leuven & B. Sianesi. (2003). "PSMATCH2: Stata module to perform full Mahalanobis and propensity score matching, common support graphing, and covariates imbalance testing". http://ideas.repec.org/c/boc/bocode/s432001.html).

Panel C: Outcomes for treatment and control group

Dependent variable: $Ln(SB_t/SB_{t-1})$				Dependent variable: $Ln(EqHold_t/EqHold_{t-1})$			
Treatment group	Control group	t-stat.	Γ	Treatment group	Control group	t-stat.	Γ
0.23	0.36	-1.98	1.75	0.40	0.24	1.89	1.25

If the odds ratio (denoted Γ) equals one, then $\pi_j = \pi_k$ when $\mathbf{x}_j = \mathbf{x}_k$, so the study would be free of hidden bias. If Γ = 2, this implies that two units that appear to be similar (i.e. who have the same **x**) could differ in their odds of receiving treatment by as much as a factor 2 (i.e. one could be twice as likely to receive treatment as the other). So Γ measures the extent of departure from a benchmark situation that is free of hidden bias (Rosenbaum, 2002). The sensitivity of the observed statistically significant results is assessed by estimating the boundary Γ values where significance levels from Wilcoxon Signed Rank Statistic exceed p-values of 0.1. The results are reported in Table 5, panel C. Despite the absence of an absolute benchmark, the computed values for Γ range between 1.25 and 2, suggesting some sensitivity of the results to unobservables.

3.4.4.3.3 Heckman selection model

To further address potential selection on unobservables, remaining differences between firms selecting insiders versus outsiders as CEO successors not currently identified in the literature are also addressed by means of a treatment-effects model that controls for self-selection bias (Cameron & Trivedi, 2005). The first-stage selection equation is defined as $d_i = \gamma_i' z_i + \varepsilon_i$ where d_i is a latent variable such that $d_i = 1$ if and only if $d_i^* > 0$, and $d_i = 0$ if and only if $d_i^* \leq 0$. The effect of unobservable information is consequently included in the second-stage outcome equation by means of the inverse Mills ratio (Li & Prabhala, 2006).[48] The second-stage results for all the main variables of interest (i.e. β_1 and β_2; and δ_1 and δ_2 from equation 1 and 2 respectively) are qualitatively similar. All models are highly

[48] The set of variables included in z coincide with the set of explanatory variables specified in the equations 1 to 3. Strictly speaking, exclusion restrictions are not necessary in Heckman selection models because the models are identified by non-linearity. Nonetheless multicollinearity concerns may arise not mitigated by merely including instruments in z however. The inclusion of weak instruments most likely still gives rise to multicollinearity issues (Li & Prabhala, 2006).

significant ($p<0.1$). The inverse Mills ratios are insignificant in all regressions, indicative of a lack of endogeneity bias in the regressions (not tabulated).

3.5 Conclusions and limitations

This paper argues that outside CEO successors are prone to short-termism due to greater outside employment alternatives and an inclination to quickly show results in an attempt to build reputation in their new firm. The question addressed in this paper is to what extent firms anticipate and account for short-termism of outside CEO successors by granting them less short-term incentives and more long-term incentives. Empirical results show that outside CEO successors report smaller salary and bonus elasticities which signify that inside CEO successors are awarded relatively more short-term oriented cash compensation contingent on current earnings compared to outside CEO successors. In addition, outside CEO successors report greater equity portfolio elasticities. This implies that outside successors are provided greater long-term oriented incentives contingent on both future earnings targets and future stock price. From this evidence I conclude that CEO successors that are attracted from outside the firm are provided less (more) short-term (long-term) incentives relative to inside CEO successors.

A caveat is the limited sample size. Although the sample size of empirical studies that focus on relatively rare phenomena such as CEO successions is relatively limited, my choice for investigating this research question in a UK setting does not alleviate any sample size concerns. However, I believe that this UK setting, where a major part of stock-based incentives is simultaneously tied to future stock price and future accounting targets, enables me to research the question of interest in a straightforward manner. That is, the UK setting enables me to make a cleaner distinction between short-term and long-term incentives than would have been possible in a US setting. In making this trade-off, I believe that the results can be better attributed than would be possible with a larger US sample. Further, although I document that firms address potential distortions in intertemporal decision-making, it is still unclear whether it is economically rational for firms to design CEO compensation such that the short-term orientation of executives is completely mitigated. Future research could therefore explore the extent to which executives that are prone to short-termism indeed act accordingly.

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Appendix 1: Variable definitions

Variable name	Description
Dependent variables:	
$Ln(SB_t/SB_{t-1})$	Natural logarithm of the difference in salary and bonus for year t+2 relative to the year t+1.
$Ln(EqHold_t/EqHold_{t-1})$	Natural logarithm of the difference in the unrealized value of the CEO's portfolio of stock and stock options for the end of year t+2 relative to the beginning of year t+2.
Independent variables:	
F_OUTSIDER	Indicator variable equal to one if the CEO successor is from outside the firm, zero otherwise.
TSR	Stock market-based performance measure which denotes the percentage change in shareholder value.
ΔROA	Change in the ratio of operating income divided by the book value of total assets.
ΔIA_ROA	Change in the ratio of operating income divided by book value of total assets minus the mean change in the ratio of operating income divided by the book value of total assets of industry-matched firms.

Control variables:	
Size	Natural logarithm of the book value of total assets.
Growth	Ratio of market value of equity divided by the book value of equity.
Risk	Standard deviation of stock returns over the five years prior to CEO turnover.
Bsize	Number of internal and external board members.
OutsBoard	Proportion of outside directors on the board.
BusyB.	Proportion of outside directors that serve on four or more boards.
CeoChair	Indicator variable equal to one if the CEO is also chairman of the board, zero otherwise.
Blockh.	Total ownership of external blockholders (i.e. value of shares owned by shareholders owning ≥ 5% of outstanding shares divided by total value of outstanding shares).
D_Loss	Indicator variable equal to one if the firm has a negative shareholder return, zero otherwise.
Leverage	Ratio of the book value of liabilities divided by the book value of total assets.
FreeCash	Ratio of operating income to total sales.

Cashconstr.	Three year average of common and preferred dividend + cash flow used in investing activities – cash flow from operations divided by the book value of total assets.
Age	Age of the CEO successor in years.
Gender	Indicator variable equal to one if the CEO successor is male, zero otherwise.

Chapter 4: Nonfinancials and the incentive intensity of CEO bonus contracts

4.1 Introduction

This paper documents that the weights that firms assign to nonfinancial performance measures is negatively associated with pay for performance. In multi-task settings, it is argued that nonfinancial performance measures are informative of the allocation of effort to dimensions that are associated with long-term value (e.g. Ittner & Larcker, 1998; Banker et al., 2001). I argue that adding nonfinancial measures to CEO bonus contracts may not completely resolve the congruence problems that would originate from a sole reliance on financial measures. This is because various nonfinancial performance measures are not available for contracting (Budde, 2007), weights used to elicit effort in all important performance dimensions will most probably not coincide with the weights that bring about value creation across all performance dimensions (Milgrom & Roberts, 1992; Baker, 2002), nonfinancial measures are imperfect proxies of firm value (Baker, 2002), and because of the difficulty of assigning weights to each of the multiple performance measures due to the complex and ambiguous relation between nonfinancial measures and financial outcomes (Ittner et al., 2003; Sedatole et al., 2007). This paper therefore examines whether the probable inadequate contribution of nonfinancial measures to the congruence of the overall performance measure prompts firms to decrease incentives provided through the bonus contract, or alternatively, whether firms that want to provide strong incentives decrease their weight on the nonfinancial measures in the bonus contract.

An exclusive reliance on financial performance measures can be appropriate for companies where, for instance, earnings are informative of managerial effort. Ittner et al. (1997) show that earnings are informative of performance in terms of increasing operating efficiencies for those companies that adopt defender-oriented strategies. Bushman et al. (1996) document that earnings are informative of managerial effort for firms that are characterized by relatively short product development and product life cycles. For the sample examined by Ittner et al. (1997), 203 of the 317 firms exclusively relied on summary financial measures in their respective CEO bonus contracts. However, other firms face conditions such that earnings may not capture all

important dimensions of managerial effort and thus nonfinancials may provide incremental information beyond summary financial measures (Banker & Datar, 1989).

Besides the potential benefits that nonfinancial measures provide in such settings, distinctive difficulties are associated with adding nonfinancial measures to CEO bonus contracts. For firms where a sole reliance on financial measures leads to an incongruent incentive scheme, assigning a non-zero weight to nonfinancial measures may not resolve the incongruity concerns because various nonfinancial measures are not available for contracting (Ittner et al., 1997; Budde, 2007). The resulting incentive scheme comprising financial measures and an incomplete set of nonfinancial measures would still be incongruent, i.e. an unbalanced provision of effort is elicited (Budde, 2007).

Furthermore, contrary to financial measures that summarize actions in one single performance metric, nonfinancial measures are 'specific' measures that provide information about a subset of actions executed within an organizational unit (Abernethy et al., 2004; Moers, 2006). Since nonfinancial measures do not capture all benefits and corresponding costs related with specific managerial actions (e.g. quality initiatives), nonfinancial measures are imperfect proxies of firm value by nature. Compared to measures that are more closely related to economic profit (e.g. residual income), nonfinancial measures in itself are more likely to contribute to distortion. The potential incongruity that may stem from adding nonfinancial measures to bonus contracts is amplified by the complex nature of the relationship between nonfinancials and measures of future financial performance, which exhibits many non-uniformities (Dikolli & Sedatole, 2007). For instance, Ittner & Larcker (1998) document diminishing economic returns to investments in customer satisfaction, such that a strong emphasis on e.g. quality may result in costly quality initiatives even though these actions may fail to be sufficiently reflected in future sales numbers. Likewise, Baker (2002) points out the hazards of including customer satisfaction in bonus plans since there are simply too many ways to increase customer satisfaction without increasing profits. Datar et al. (2001) argue that in determining the weights for performance measures, one should not only take into account the congruity of each individual measure, but also how each measure interacts with other measures in the contract (so called carryover effects) .

Therefore, assigning relative weights to multiple financial and nonfinancial measures in bonus contracts will most likely lead to situations where bonuses are paid even though the performance is unbalanced in the sense of overachieving some objectives and underachieving other objectives (Ittner et al., 2003). The established weights can easily disconnect the performance achievements in each measure with the value that should be created through those achievements. Hodak (2005) indeed suggests that achievement on nonfinancial performance measures often does not translate into shareholder returns and documents that firms that adopted executive bonus plans composed of multiple financial and nonfinancial measures underperform their peers by 3.2% annually.

Firms facing inherently incongruent incentive schemes can alleviate concerns about incentivizing an unbalanced provision of effort by muting the provision of incentives (Holmstrom & Milgrom, 1991). Reduction of the incentive intensity mitigates the risk that misdirected effort is provided in response to a given set of incentives (Bouwens & van Lent, 2006). Consistent with this, Baker (2002) explains the (optimally) weak incentives in some organizations from the fact that these organizations often lack undistorted performance measures. Thus firms that add nonfinancial measures to the financial summary measures in their bonus contracts can mitigate the concerns about misdirected effort by lowering the corresponding bonus incentive intensity. Alternatively, firms that seek to provide increased incentives may reduce the explicit weight assigned to nonfinancial measures and improve the congruence of the overall performance measure in alternative ways (e.g. by shielding the income numbers from the impact of strategic expenditures as documented by Duru et al. (2002)).

I examine the association between the relative weights assigned to nonfinancial performance measures and the bonus incentive intensity using a sample of 164 observations of Dutch firms listed on the Amsterdam Stock Exchange. Since the prior literature has clearly established the joint nature of firms' performance measurement and incentive compensation decisions (Jensen & Meckling, 1992; Milgrom & Roberts, 1992), I account for the possibility that firms' decision to assign some weight to nonfinancial measures in the CEO bonus contract and the choice regarding the

intensity of the bonus incentives will be jointly determined.[49] Given this joint nature, I employ a simultaneous equations model. To address concerns regarding 2SLS models, I heed the advice of Larcker & Rusticus (2008) and execute a wide range of sensitivity analyses to infer: i) the extent to which assumptions of relevance and exogeneity of the proposed instruments apply in my setting; and ii) the sensitivity of the results to potential violations of these assumptions. The analyses provide conclusive evidence on the question whether firms that seek to provide increased incentives lower their bonus incentive intensity. Here I find that firms that want to provide increased incentives lower the relative emphasis on nonfinancial measures in their CEO bonus contracts for both the OLS and 2SLS analyses. However, regarding the question to what extent firms that assign a non-zero weight to nonfinancial measures in their CEO bonus contracts adjust their bonus incentive intensity, the evidence is inconclusive. Where the OLS analyses suggest that firms lower their incentive intensity, this is not substantiated by the 2SLS analyses. The results are similar when I, amongst others, explicitly account for the use of weak instruments through employing Moreira's instead of 2SLS, and use bias-corrected bootstrapped confidence intervals instead of normal theory test statistics.

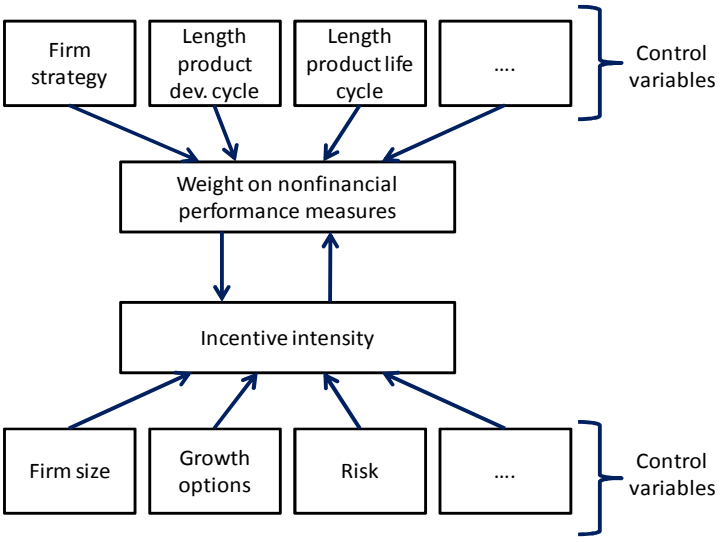
The contribution is twofold. First, this study explicitly addresses the drawbacks of the use of nonfinancial performance measures. Where much of the prior literature has focused on the potential of nonfinancial measures for improving congruence, I elaborate on the potentially limited contribution of nonfinancial measures in improving the congruence problems that would arise if those firms solely relied on financial measures. I document that firms anticipate for this by lowering their bonus incentive intensity. Second, I account for the joint nature of firms' decisions to assign weights to nonfinancial measures and the decision regarding the incentive intensity through employment of a 2SLS model. This approach has provided me with the opportunity to apply to an empirical study the methodological improvements suggested by, among others, Murray (2006) and Larcker & Rusticus (2008).

[49] However, organizational design is not limited to these two choices (e.g. Jensen & Meckling (1992) elaborate on the interrelations between delegation of decision rights, performance measurement, and incentive compensation design). As such, this study represents a simplified partial equilibrium analysis that takes other choices as given.

4.2 Literature review and hypotheses

Milgrom & Roberts (1992) argue that the provision of incentives and the ability to monitor managerial actions through performance measures can be regarded as complementary. Thus firms that want to increase the provision of incentives need to increase the quality of the performance measures in order to facilitate the increased incentive intensity. The informativeness principle suggests that firms should include performance measures such as nonfinancials in contracts as long as each measure allows for a reduction of the error with which the agent's choices are estimated (Milgrom & Roberts, 1992). However, adding nonfinancial measures can also contribute to distortion since paying for customer satisfaction, for instance, may encourage employees to exploit non-profit-maximizing ways to curry favor with customers, which in turn drives profit numbers down (Baker, 2002). As including nonfinancial measures in contracts can thus potentially decrease the quality of the performance measures, in this study I examine the association between the weight assigned to nonfinancial measures and the extent to which firms use performance pay. As the decisions regarding performance measurement and provision of incentives are jointly determined (Jensen & Meckling, 1992; Milgrom & Roberts, 1992), I treat the weight assigned to nonfinancial measures and incentive intensity as endogenous. Figure 1 outlines the focal structural model of this paper.

Figure 1: Focal structural model



Determinants of incentive intensity

Prior research distinguished a wide range of firm-specific variables explaining the provision of incentives within firms. I expand on the existing literature by also including the relative weight assigned to nonfinancial performance measures as an additional determinant of the bonus incentive intensity. The bonus incentive intensity is thus modeled as follows:

Incentive intensity = f (weight on nonfinancial measures, control variables). (1)

While financial measures such as earnings may sufficiently convey underlying action choices in some firms, at other companies financial measures may not sufficiently convey pivotal performance dimensions while nonfinancial measures may be incrementally informative about effort allocated to dimensions associated with long-term firm value (Ittner et al., 1997; Ittner et al., 1998; Banker et al., 2001).[50,51] However, there are distinctive costs associated with adding nonfinancial measures to the financial measures in bonus contracts.

First, for firms where a sole reliance on financial measures would lead to an incongruent incentive scheme, putting a non-zero weight to additional nonfinancial performance measures in CEO bonus contracts may not resolve the incongruity concerns because various nonfinancial measures are non-verifiable and therefore cannot be used in contracting.[52] Given that some nonfinancial measures are not available for contracting, Budde (2007) analytically demonstrates that the resulting incentive scheme is incongruent, i.e. an unbalanced provision of effort is elicited.

[50] More specifically, a sole reliance on financial summary performance measures in bonus contracts may be appropriate for firms adopting defender-oriented strategies since short-term backward-looking measures such as operating income are relatively informative measures of the performance in terms of increasing operating efficiencies (Ittner et al., 1997). Likewise, in firms characterized by short product development and product life cycles, summary accounting measures such as earnings represents relatively informative measures of managerial effort (Bushman et al., 1996). However for firms characterized by adoption of prospector-oriented strategies and/or long product development and product life cycles, earnings may be not informative about the managerial effort allocated to dimensions of effort associated with long-term value and thus nonfinancial measures may be incrementally informative (Bushman et al., 1996; Ittner et al., 1997).

[51] Consistent with the informativeness principle, prior studies by Amir & Lev (1996) and Rajgopal et al. (2003) documented for firms where accounting earnings did not adequately reflect investments in intangible assets, the information incorporated in nonfinancial measures contributes in explaining stock price. So these nonfinancial measures have the potential to improve the congruence of the overall performance measurement system.

[52] Likewise, Ittner et al. (1997) refer to nonfinancial performance measures as potentially more prone to managerial manipulation and rarely subject to public verification, and Lambert (2001) classifies the information incorporated in such forward-looking measures as less reliable and more susceptible to manipulation.

Therefore, the introduction of compensation contracts with an incomplete set of performance measures leads to distorted incentives (Baker, 2002).[53]

Second, multiple performance measures are weighted in contracts such that effort is elicited in all relevant dimensions of effort. It is however unlikely that these weights are perfectly congruent with the weights that bring about value creation across all performance dimensions (Milgrom & Roberts, 1992). That is, putting more weight on a performance measure to take advantage of an improved signal-to-noise ratio makes the overall performance measure less congruent (Datar et al., 2001).

Third, the incongruity will most likely not be resolved for those companies that add nonfinancial measures in their bonus contracts because nonfinancials (opposed to financial measures that are more encompassing) are 'specific' measures that provide information about a subset of actions carried out within an organizational unit (Abernethy et al., 2004; Moers, 2006). Since the majority of nonfinancial measures do not encompass all benefits and corresponding costs associated with certain managerial actions (e.g. quality initiatives), nonfinancial measures are imperfect proxies of firm value. The potential incongruity that may stem from adding nonfinancial measures to CEO bonus contracts is amplified by the complex nature of the relation between the nonfinancial measure outcomes and future financial performance (Bushman, 1996; Dikolli & Sedatole, 2007). That is, there may be considerable variation across different firms and products in how long it takes for a nonfinancial measure to begin to affect financial performance and for how long this beneficial effect is likely to persist (Dikolli & Sedatole, 2007). The relation between nonfinancial measures and financial outcomes may be influenced by moderating variables. Sedatole (2003) for instance documents that the relation between a quality-related nonfinancial measure and future warranty expenses is moderated by customer expectations. Most importantly, there may exist nonlinearities in the relationship between a nonfinancial performance measure and future financial performance (Dikolli & Sedatole, 2007). Ittner & Larcker (1998) document diminishing economic returns to investments in customer satisfaction such that at a certain point the costs of additional quality improvements outweigh the benefits. Furthermore, Ittner & Larcker (1998) document performance threshold such that customer satisfaction thresholds must be met before

[53] Baker (2002) refers to the fact that the agent can take many more actions than the firm can measure. Datar et al. (2001) refer to the difficulty of achieving congruity because firms have fewer slope coefficients than actions.

customers start changing their purchasing behavior. Sedatole (2003) provides evidence of asymmetry in the sense that increases in financial performance following increased levels of a given nonfinancial measure differ in magnitude from declines in financial performance due to decreased levels of a given nonfinancial measure. That is, the negative response of dissatisfied customers (i.e. decline in repurchase intent) is stronger than the positive response of satisfied customers. This complex and ambiguous relation between nonfinancial measures and financial outcomes thus severely complicates the task of optimally weighting the performance measures in the bonus contract. That is, establishing the optimal weights requires not only taking into account how much each individual measure is congruent with firm value but also taking into account the carryover effects, i.e. how it will interact with the other measures in the contract (Datar et al., 2001).

Kaplan & Norton (1996) were therefore cautious about assigning explicit weights to multiple financial and nonfinancial performance measures in contracts because of the probable emergence of unintended or unexpected consequences. Ittner et al. (2003) recognized the difficulty of determining the relative weights when multiple performance measures are included in CEO bonus contracts, and they explicitly referred to situations where bonuses will be paid even when the performance is unbalanced (i.e. overachievement on some objectives and underachievement on other objectives). An unbalanced provision of effort is thus elicited. Nonetheless, firms that are facing concerns about incongruent incentive schemes can alleviate those concerns through muting the provision of incentives within the bonus contract (Holmstrom & Milgrom, 1991). Reducing the intensity of incentives mitigates the risk that agents will provide misdirected effort in response to a given set of incentives (Baker, 2002; Bouwens & van Lent, 2006).

Determinants of nonfinancial performance measures

The prior literature on performance measurement has examined the decision of firms to assign non-zero weight to nonfinancial performance measures in CEO bonus contracts. I add to the prior literature by including the bonus incentive intensity as the main explanatory variable of interest. Thus, the relative weight assigned to the nonfinancial performance measures in CEO bonus contracts is modeled as follows:

Weight on nonfinancial measures = f (incentive intensity, control variables). (2)

The prior literature established that large firms in particular (Smith & Watts, 1992), which employ high-ability managers (Jin, 2002), face large growth options (Smith & Watts, 2002), and have relatively weak governance (Engel, 2002) provide strong incentives. Firms that seek to provide increased incentives desire performance measures that are more or less congruent (Baker, 2000; 2002). However, nonfinancial performance measures are imperfect proxies of firm value and can potentially impair the congruence of the overall performance measure (Baker, 2002). The prior literature nevertheless distinguished three alternatives to improve the quality of the overall performance measure for firms that want to provide significant incentives as well as to emphasize dimensions of managerial effort associated with long-term value (e.g. quality). This enables firms to lower their emphasis on 'specific' nonfinancial measures in contracts.

First, firms can decide to improve the financial summary performance measure. Prior literature documents how firms adjust for items in reported earnings to ensure that executives are deterred from selecting value-decreasing activities and/or are not deterred from taking value-enhancing activities. Firms are reported to adjust for restructuring charges (Dechow et al., 1994), (low) earnings persistence (Baber et al., 1998), losses (Gaver & Gaver, 1998), and discretionary accounting accruals in the CEO's terminal year (Huson et al., 2003).[54] Duru et al. (2002) report how firms shield executive compensation from the impact of strategic expenditures (i.e. research & development and advertising expenditures) to make the shielded income number more congruent with firms' objectives. Cheng (2004) documents how firms prevent reductions in R&D expenditures when CEOs approach retirement and/or face small earnings declines or losses by adjusting for R&D spending in CEO compensation. Second, firms can use stock price for contracting as stock price represents an aggregate measure of future value that impounds all existing publicly available information including information contained in nonfinancial measures (Davila & Venkatachalam, 2004). However recent findings suggest that price does not efficiently incorporate the implications of nonfinancial measures (e.g. Rajgopal et al.,

[54] That is, executives are not deterred from undertaking value-enhancing restructurings (Dechow et al., 1994), or from undertaking actions that result in current period losses yet improve the firm's long-term prospects (Gaver & Gaver, 1998), but are deterred from taking actions that sacrifice long-term profitability for short-term profit gains (Baber et al., 1998), and are deterred from taking actions that result in aggressive positive accruals and failing to take necessary negative accruals in the CEO's terminal year (Huson et al., 2003).

2003). Further, even if price efficiently incorporates information in accounting and nonfinancial measures, it would still be difficult to replace nonfinancial measures by stock price. Stock price may suffer from high levels of noise which makes contracting more costly. Furthermore, stock price is likely to be an incongruent measure, i.e. the weights on different signals that are implicit in determining stock price is based on their implications for future cash flows, instead of their informativeness about action choices of agents (Feltham & Xie, 1994). Third, Dikolli (2001) demonstrates that firms can motivate agents to select actions associated with long-term value through contracting on long-term backward-looking summary measures. For example, incentive plans where compensation is tied to long-term accounting performance targets (e.g. 3-year EPS targets) are informative of, and incentivize managers towards, acceptance of positive NPV projects where expenditures are incurred shortly and the corresponding positive earnings effects materialize within the three-year window. However, the extent to which firms that want high-powered incentives and want to emphasize dimensions of managerial effort associated with long-term value decrease their relative weight on nonfinancial measures in CEO bonus contracts (to avoid strongly incentivizing an unbalanced supply of effort) depends on the trade-off between the costs and benefits of relying on an inherently incongruent CEO bonus plan composed of multiple measures versus the costs and benefits of each of the different alternatives, making this an empirical question.

To conclude, I argue that firms that seek to provide increased incentives could lower the weight assigned to nonfinancial measures and/or conversely, that firms that assign larger relative weights to nonfinancial measures could lower the incentive intensity. Based on these arguments, the hypothesis concerning the two variables of interest is described as follows (stated in the null-form):

H1: The use of nonfinancial performance measures is not associated with the incentive intensity.

4.3 Methodology

4.3.1. Sample

The sample was drawn from firms listed on the Amsterdam Stock Exchange from 2004 to 2006, yielding an initial sample of 379 observations. For the analyses, only

those firms are retained that disclose information in their annual reports about the explicit weights allocated to financial versus nonfinancial performance measures in their CEO annual bonus plan. So this sample consists of: i) companies that solely rely on financial performance measures for their annual CEO bonus; and ii) companies that assign specific weights to financial and nonfinancial performance measures.[55] Data on CEO cash compensation is retrieved from annual reports and Boardex, while data on balance sheet items, accounting and stock market performance is retrieved from Compustat Global, Worldscope, and Datastream respectively. Governance and ownership data is collected from Boardex and Amadeus, and data on CEO characteristics is retrieved from the annual reports and Boardex. This yields a final sample of 164 observations.

4.3.2 Variable measurement

INC_INT denotes incentive intensity (i.e. the degree to which CEO cash compensation depends on performance) and is measured as the ratio of cash bonus to the sum of salary and cash bonus (Roulstone, 2003). NONFIN denotes the relative weight of nonfinancial performance measures in CEO annual bonus contracts (Ittner et al., 1997; Said et al., 2003).

The following exogenous control variables are included as determinants of the relative emphasis on nonfinancial performance measures in CEO annual bonus contracts. STRAT denotes firms that adopt a prospector strategy (opposed to a defender strategy) and is measured as a composite measure of: i) the ratio of research and

[55] For example, TNT specified for 2005 that "the short term incentive scheme for the members of the Board of Management reflects the accountability for our mission by rewarding for both financial and non-financial performance as required for sustainable results. Therefore financial and non-financial targets are set. The financial targets for the chief executive officer are set in terms of earnings from continuing operations (earnings and economic profit). Non-financial targets are related to the elements of our mission that do not directly impact our financial performance in the short term but are crucial to the continued success of our company in the long term. For each member of the management board specific non-financial targets are agreed with the supervisory board relating to elements of our mission. Instilling pride in our people: continuous improvement in engaging our people, which can be measured through employee satisfaction surveys. Exceeding customers' expectations: continued improvements in our relations with customers, which can be measured through customer satisfaction surveys. The "at target" bonus level of 60% of the base salary consists for 80% of reward for achieving financial targets and 20% of reward for achieving non-financial targets." Overall, a wide range of accounting-based performance measures is used such as earnings per share, net income, operating income, return on capital employed, economic value added, sales, and other summary accounting performance measures. Specific targets of nonfinancial performance measures are in the area of customer satisfaction, research & development, intellectual property, strategic objectives, operational excellence, leadership, corporate sustainability, and so on. Specific performance measures and corresponding target levels are in the majority of the cases classified as proprietary information and therefore not disclosed in detail.

development to sales; ii) the market-to-book ratio; and iii) the ratio of employees to sales as an average over the prior three years using principal component analysis (Said et al., 2003).[56] Prospector firms are more involved in innovative actions and thus should allocate more resources to research and development (relative to their respective sales levels), prospector firms are expected to have greater growth opportunities represented by greater market-to-book ratios, and prospectors should be less focused on achieving optimal efficiency relative to defender firms, which should be reflected in a greater number of employees per unit of sales (Ittner et al., 1997; Said et al., 2003). Since the financial performance measures are less informative about the managerial effort allocated to e.g. innovative activities, it is expected that prospector firms assign greater relative weight to nonfinancial measures. PRODDEV and PRODLIFE denote length of the product development cycle and length of the product life cycle respectively. Shorter length of product development cycle and product life cycle both indicate a greater importance of innovative activities and a greater informativeness of financial measures to such dimensions of managerial effort (Bushman et al., 1996). Firms are classified as having a short versus long product development cycle and product life cycle on the basis of their two-digit SIC code and business description in their annual report according to the classification scheme from the National Academy of Engineering (1992) (Bushman et al., 1996; Said et al., 2003). Prior research also suggested that financial distress is associated with the use of nonfinancial measures in CEO bonus contracts (Ittner et al., 1997; Said et al., 2003). Two proxies are used for financial distress. D_LOSS is an indicator variable equal to one if the company reports negative profit in the prior year, zero otherwise (Matejka et al., 2005). LEV denotes the leverage and is measured as a three-year average of the ratio of total liabilities to total assets (Said et al., 2003). RISK denotes the noise in the accounting performance measures and is measured as the standard deviation in return on assets over the five prior years (Ittner et al., 1997). CEO_TEN proxies for the power of the incumbent CEO and is measured as the number of years

[56] Principal component analysis is used to measure latent characteristic of a firm's strategy choice. Thus, the principal component is an exact linear combination (i.e. weighted sum) of the original variables. Consistent with the interpretation of a prospective strategy, the component has positive loadings on the ratio of research and development to sales, and the market-to-book ratio, and a negative loading on the ratio of number of employees to sales. Bartlett's test of sphericity ($\chi 2 = 38.82$, $p < 0.01$ with H_0: all correlations are zero) suggests that the correlations are sufficient to infer a probable underlying factor structure. Also the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy of about .55 suggests a moderate correlation structure (with a theoretical range between zero and one).

the CEO is in position (Bushman et al., 1996; Davila & Venkatachalam, 2004). SIZE denotes firm size and is measured as the natural logarithm of the three-year average of total assets. DIVERS denotes the extent to which the firm has diversified in different activities. A greater degree of diversification can be associated with organizational complexity and thus monitoring difficulty (Bushman et al., 2004), delegation of decision rights (Christie et al., 2003), and to the extent that nonfinancial measures differ across different business segments, with a tendency to evaluate and reward managers less on the unique nonfinancial performance measures and instead evaluate and reward more on common accounting performance measures (Lipe & Salterio, 2000). DIVERS is measured as the number of reported segments (Denis et al., 1997). Finally, EQ_INC denotes the CEO's equity incentives and is measured as the change in the value of the CEO's equity portfolio for a 1% change in stock price (Core & Guay, 1999; Baker & Hall, 2004). Stock price may substitute for nonfinancial measures as an alternative forward-looking performance measure to motivate CEOs to select actions aligned with owners' long-term interests (Ittner et al., 1997; Dikolli, 2001).

The following exogenous control variables are included as determinants of the incentive intensity of the CEO annual bonus contracts. Core et al. (1999) discern four main economic determinants that explain the provision of incentives through CEO compensation contracts. First, larger firms are associated with greater monitoring difficulty and require more highly talented managers who are more highly compensated (Smith & Watts, 1992) and are expected to be wealthier (Baker & Hall, 1998). If CEOs' utility functions exhibit declining absolute risk-aversion, CEOs of larger firms are expected to be provided greater incentives (Baker & Hall, 1998). Second, the presence of growth opportunities proxy for monitoring difficulty (Smith & Watts, 1992), which could be addressed through ex-ante interest alignment through the provision of (equity) incentives. Also, monitoring difficulty increases with the extent to which firms operate in noisy and unpredictable environments. This can be addressed through ex-ante interest alignment through the provision of incentives. However, the risk-averse nature of CEOs implies that the provision of incentives will decrease with the noise in performance measures following standard agency predictions (Aggarwal & Samwick, 1999). Fourth, firm performance is expected to explain the actual provision of incentives. Firm performance is measured as stock-

market performance (TSR) and return on assets (ROA). So SIZE, GRWTH, RISK, TSR, and ROA are included as exogenous control variables. Furthermore, corporate governance mechanisms are claimed to substitute for the provision of incentives as a means to mitigate moral hazard concerns (Engel et al., 2002). Three variables are included to proxy for the effectiveness of board monitoring.[57] BSIZE denotes board size and is measured as the total number of directors on both the management board and the supervisory board (de Jong et al., 2005). OUTSB denotes size of the supervisory board relative to the size of the management board (Core et al., 1999; de Jong et al., 2005). Following prior literature which claims that many directors serve on too many boards to adequately fulfill their supervisory duties, BUSYB denotes busy boards and is defined as the proportion of directors that serve on four or more boards. To proxy for the presence of large shareholders, BLOCKH denotes the fraction of shares held by large shareholders defined as shareholders owning ≥ 5% of the firm's outstanding shares. LEV and D_LOSS refer to the notion that firms in financial distress may have different compensation structures (Matejka et al., 2005). CEO_TEN addresses the idea that more powerful CEOs can have different incentive compensation structures (Ittner et al., 1997). The organizational complexity that is associated with diversification (DIVERS) can result in strengthened corporate governance and/or a higher degree of ex-ante interest alignment through the provision of incentive compensation (Bushman et al., 2004). Finally, EQ_INC represents equity incentives imposed on the CEO that can substitute or complement with the cash-bonus incentives faced by the respective CEO (Dikolli, 2001).

4.3 Empirical models

The hypothesis is tested through a simultaneous equations model that describes the determinants of each of the endogenous variables and their respective interrelation. The system of equations can be described as follows:

$$\begin{aligned} INC\_INT = {} & \beta_0 + \beta_1 NONFIN + \beta_2 SIZE + \beta_3 GRWTH + \beta_4 RISK + \beta_5 TSR + \beta_6 ROA \\ & + \beta_7 BSIZE + \beta_8 OUTSB + \beta_9 BYSYB + \beta_{10} BLOCKH + \beta_{11} LEV + \beta_{12} D\_LOSS \\ & + \beta_{13} CEO\_TEN + \beta_{14} DIVERS + \beta_{15} EQ\_INC + \varepsilon_1 \end{aligned} \quad (3)$$

[57] Dutch companies operate under a two-tier management structure consisting of a supervisory board comprised entirely of outside directors and a management board. In the Netherlands, there is a close relationship between management and supervisory boards as for example illustrated by the influence of the management board on the appointment of members of the supervisory board (de Jong et al., 2005).

$$NONFIN = \gamma_0 + \gamma_1 INC\_INT + \gamma_2 STRAT + \gamma_3 PRODDEV + \gamma_4 PRODLIFE + \gamma_5 SIZE + \gamma_6 RISK + \gamma_7 LEV + \gamma_8 D\_LOSS + \gamma_9 CEO\_TEN + \gamma_{10} DIVERS + \gamma_{11} EQ\_INC + \varepsilon_2 \quad (4).$$

Regarding the choice to estimate this system of equations by OLS or 2SLS, the approach was to use OLS unless the exogeneity of the explanatory variables has to be rejected (Wooldrige, 2002, p. 104).[58] So after having verified that the proposed instruments satisfy the exogeneity condition (Larcker & Rusticus, 2008),[59] a Durbin-Wu-Hausman test provides mixed evidence (NONFIN: $\chi^2 = 4.84$ with $p = 0.03$; INC_INT: $\chi^2 = 0.02$ with $p = 0.90$) on the exogeneity of the variables of interest. By reporting both OLS and 2SLS estimates, I heed the advice of Larcker & Rusticus (2008) to report OLS results supplemental to IV estimates as a means to address the potential shortcomings of IV estimation in the case of some semi-endogenous instruments (i.e. instruments that are somewhat correlated with the unexplained part of the dependent variable of interest) and weak instruments (i.e. instruments that have weak correlation with the endogenous explanatory variable of interest).[60] To enable

[58] As opposed to the case where explanatory variables are exogenous and OLS estimates are typically characterized as efficient and unbiased estimators, OLS estimation generally results in inconsistent estimators of all coefficients when one or more explanatory variables are endogenous. However, the cost of using instrumental variables for estimation is an inevitable loss of efficiency if the explanatory variable is exogenous, i.e. the asymptotic variance of the IV estimator is (much) larger compared to the asymptotic variance of the OLS estimator (Wooldridge, 2002).

[59] A typical setup contains an endogenous y that is a function of an endogenous x variable, a set of exogenous control variables (z_1), and error term u. There are multiple instruments (z_2) not included in the equation explaining y. In most cases the test for exogeneity of x employs a regression-based procedure where it is assumed that the set of variables z ($z = z_1+z_2$) is not correlated with error term u. If one specifies a linear projection of x on z, i.e. $x = \lambda z + v$ with $E(zv)=0$, then x is endogenous if and only if $E(uv)\neq 0$. Intuitively one could say that considering the exogenous nature of z, v should capture the possible endogenous component of x. So this procedure tests for significance of residuals v in a regression of y on z_1, x, and v (Wooldridge, 2002). Thus the exogeneity of the instruments z_2 should be tested before testing for exogeneity of the potentially endogenous explanatory variable x (Larcker & Rusticus, 2008). The regression-based procedure for testing for overidentifying restrictions (i.e. exogeneity of instruments) follows two steps: i) regress y on all exogenous variables z using 2SLS; and ii) regress the computed residuals on all exogenous variables z. The test-statistic follows a chi-squared distribution with degrees of freedom equal to the number of available instruments minus the number of suspect endogenous variables) and a null hypothesis that the proposed instruments are exogenous. The test-statistics do not reject the null for the instruments of NONFIN and INC-INT respectively.

[60] Larcker & Rusticus (2008) emphasize that when an instrument is even slightly endogenous and the instrument is weakly correlated with the regressor, IV-methods produce highly biased estimates. Moreover in those cases, it is likely that IV-estimates are more biased and more likely to result in wrong statistical inferences relative to simple OLS estimates that do not correct for endogeneity. More specifically, the probability limit of the OLS estimator can be written as: $\text{plim } b_{ols} = \beta + \text{cov}(x,u) / \text{var}(x) = \beta + \sigma_u / \sigma_x \text{ corr}(x,u)$. So if x is exogenous (i.e. uncorrelated with u), the OLS estimator is a consistent estimator of the true coefficient. However, if instrumental variables z are used for an endogenous x variable, the probability limit of the IV estimator can be written as: $\text{plim } b_{IV} = \beta + \text{cov}(z,u)/\text{cov}(x,z) = \beta + \sigma_u / \sigma_x \text{ corr}(z,u)/\text{corr}(x,z)$. If the instrument z is exogenous, the IV estimator is a consistent estimator of the true coefficient. On the other hand, if the instrument is not exogenous, the consistency result is no longer obtained. Note that in the case of semi-endogenous instruments (i.e.

2SLS estimation of equations (3) and (4), exclusion restrictions are needed for both equations. For instance, the key restriction for 2SLS estimation of equation (3) is that STRAT, PRODDEV and PRODLIFE are correlated with NONFIN, but have no direct effect on INC_INT after partialling out the impact of the respective exogenous control variables.[61] The extent to which the company follows a prospector strategy (STRAT), the length of product development (PRODDEV) and the length of product life cycle (PRODLIFE) impact both the importance of those dimensions of managerial effort associated with long-term value (e.g. innovation) and the extent to which accounting performance measures are informative about such actions. Hence prior studies found that firms using a prospector strategy assign higher weight to nonfinancial measures in bonus contracts (Ittner et al., 1997; Said et al., 2003) and that firms facing longer product development cycles and product life cycles assign higher weight to nonfinancial measures (Bushman et al., 1996; Said et al., 2003). Taking into account that the proposed instruments may redistribute incentives across different dimensions of managerial effort, it is however not a priori clear that these proposed instruments also impact the provision of incentives as a whole (after netting out the impact of the control variables). This economic intuition about the expected exogeneity of the proposed instruments for NONFIN is consistent with the results for the test of the over-identifying restrictions. Here the residuals of the 2SLS regression are regressed on exogenous variables (i.e. the exogenous control variables and the proposed instruments) where the R^2 of the model should be close to zero for the instruments to be exogenous. The resultant test-statistic of 0.28 with a corresponding p-value of 0.87 implies that the null-hypothesis of exogenous instruments cannot be rejected (see footnote 6).

The exclusion restriction for 2SLS estimation of equation (4) is that BSIZE, OUTSB, BUSYB, BLOCKH, GRWTH, and PERF are correlated with INC_INT, but have no direct effect on NONFIN after partialling out the impact of the respective exogenous

instruments with some correlation with u), the inconsistency grows larger as the corr(x,z) approaches zero. Thus seemingly small correlations between z and u can cause severe inconsistency if z is only weakly correlated with x (Wooldridge, 2002).

[61] The exogeneity condition implies that proposed instrument z_2 is uncorrelated with the dependent variable of interest y after taking into account the set of exogenous control variables z_1, i.e. $cov(z_2,u) = 0$. The rank condition implies that if we take a linear projection of the endogenous variable x on all exogenous variables: $x = \alpha_0 + \alpha_1 z_1 + \alpha_2 z_2 + v$, then the coefficient on z_2 should be nonzero, i.e. $\alpha_2 \neq 0$. Note that the loose description that z_2 should be correlated with x is not entirely correct (Wooldridge, 2002).

control variables. The first variables represent governance variables where BSIZE, OUTSB, and BUSYB reflect board composition (i.e. size, proportion of outsiders, and fraction of busy directors) and BLOCKH denotes monitoring by large shareholders. Prior literature established that these alternative monitoring mechanisms can substitute for the provision of incentives as a means to mitigate moral hazard concerns (e.g. Core & Guay, 1999; Engel et al., 2002). It is not a priori clear, however, whether these alternative monitoring mechanisms are associated with emphasizing certain dimensions of managerial effort predictive of long term value (e.g. innovation). Further, PERF and GRWTH denote performance and growth which are typified as main economic determinants for the provision of incentives (Core et al., 2003). Note that prior research documented that firms in financial distress and firms that adopt growth-oriented strategies (Ittner et al., 1997; Said et al., 2003) are more inclined to emphasize nonfinancial performance measures in CEO annual bonus contracts, which is explicitly controlled for through D_LOSS, LEV and STRAT. This economic intuition about the exogeneity of proposed instruments for INC_INT is consistent with the results of the test of the over-identifying restrictions, where a test-statistic of 8.47 with a corresponding p-value of 0.21 implies that the null-hypothesis of exogenous instruments cannot be rejected (see footnote 6). The aforementioned tests for exogeneity of the instruments are supplemented by a sensitivity analysis which examines whether the application of different instruments yields very different results. More specifically, this test compares coefficients on the possible endogenous explanatory variables (i.e. NONFIN and INC_INT) when using one single instrument at a time (Larcker & Rusticus, 2008). Here the resultant coefficients on NONFIN are not significantly different when evaluated at the 10% significance level. The resultant coefficients on INC_INT are in all - but one case - not significantly different, evaluated at the 10% level.[62] Overall, this bolsters confidence in the exogeneity of the proposed instruments.

[62] When using the instruments TSR and OUTSB, the coefficient on INC_INT is significantly different (p=0.06). Still, the removal of TSR and/or OUTSB from the set of proposed instruments leads to similar results with regard to sign, magnitude, and significance level of the coefficient INC_INT.

The relevance of the proposed instruments also has to be statistically assessed.[63] Here the partial F-statistic and partial R^2 for the first-stage regression are reported for the variables NONFIN and INC_INT.[64] For NONFIN (INC_INT), the partial F-statistic is 3.09 (1.57) with corresponding p-values of 0.03 (0.16).[65] Furthermore, the partial R^2 equals about 8.5% (7.5%) for the instruments which altogether provides evidence of the at best moderate relevance of the instruments for NONFIN and INC_INT. Therefore, supplemental to regular OLS and 2SLS test-statistics, the results of Moreira's are also reported as the critical values of the test statistic are adjusted such that the significance tests have correct size even in the presence of weak instruments (Larcker & Rusticus, 2008).[66] Finally, emphasizing robustness over efficiency, equations (3) and (4) are estimated by 2SLS equation-by-equation.[67]

[63] This is especially important considering earlier remarks reported in footnote 6. In short, in the case of some semi-endogenous instrument even small correlations between the proposed instrument z_2 and the error term u can lead to severe inconsistency in the case of weak instruments (i.e. small correlation between the endogenous variable x and proposed instrument z_2). Starting from the bias of OLS and IV estimators as described in footnote 6, Larcker & Rusticus (2008) develop the condition in which IV estimation is preferable (i.e. has a smaller absolute bias): $\sigma_u/\sigma_x\,|\text{corr}(z,u)/\text{corr}(x,z)| < \sigma_u/\sigma_x\,|\text{corr}(x,u)| = R^2_{zu} < R^2_{xz} \times R^2_{xu}$. Therefore since the partial R^2, indicative of the strength of the instruments is near 10%, this implies that the correlation between z and u can be no more than 10% of the correlation between x and u for IV estimation to still be preferable to OLS estimation. Further, the asymptotic distribution of the IV estimator is a poor approximation to the finite sample distribution in the presence of weak instruments. So in finite samples standard test-statistics become misspecified in the sense that inferences on such statistics can lead to over- or under-rejection of the null (Larcker & Rusticus, 2008).

[64] The partial F-statistic represents a test of the null-hypothesis that all instruments are insignificant against the alternative that at least one of the instruments is significant in a first stage regression of the endogenous variable x on the exogenous control variables z_1 and the instruments z_2. The partial R^2 compares the explained variance of a first-stage model of the endogenous variable x on the exogenous control variables z_1 with a first-stage model of the endogenous variable x on both the exogenous control variables z_1 and the proposed instruments z_2.

[65] Reported F-values are below the critical values of 12.83 (15.09) as suggested by Stock et al., (2002).

[66] Moreira's (2003) conditional likelihood ratio (CLR) addresses weak instrument problems by conditioning critical values to overcome distortions caused by weak instruments. Moreira's CLR is argued to be the most powerful test, as resulting confidence intervals are nearly optimal, its power does not deteriorate significantly with the addition of irrelevant instruments, and samples sizes of about 100-200 are sufficient (Andrews et al., 2006).

[67] More efficient estimators are obtained when the estimators for both equations are estimated jointly. However this is at the expense of robustness since using system procedures, all equations have to be properly specified, i.e. their respective instruments have to be exogenous. In contrast, using 2SLS equation-by-equation, an equation can be consistently estimated as long as the instruments for that particular equation are exogenous (Wooldridge, 2002; Larcker & Rusticus, 2008).

4.4. Empirical results

4.4.1. Summary statistics

Table 1, panel A report descriptive statistics for the full sample. Here 61 percent of the sample firms incorporate nonfinancial performance measures in the respective CEO bonus contracts, where the mean (median) weight of those measures in the bonus contracts is 21% (25%). About one third of total cash compensation of the CEOs originates from the annual bonus. Furthermore, the mean (median) increase in CEO wealth due to a 1% increase in stock price is €90K (€24K).

In panel B of Table 1, descriptive statistics are reported for both the subsamples that either put a non-zero weight or a zero weight on nonfinancial performance measures in their CEO bonus contracts. When difference-tests based on simple t-tests and Wilcoxon rank-sum tests are used, some significant differences between the subsamples emerge. First, note that the firms that use nonfinancials in their bonus contracts have lower incentive intensity as expected, but that this difference is not significant. Second, firms that use nonfinancial performance measures have significantly higher scores on the proxy for a prospector-oriented strategy, and have longer product development and product life cycles relative to firms that solely rely on financials. This is consistent with prior research that indicates that adoption of prospector strategies, and longer product development and product life cycles make earnings less informative about managerial effort allocated towards long-term dimensions (Ittner et al., 1997; Said et al., 2003). Third, firms using nonfinancial measures are significantly larger, have fewer growth options, have smaller leverage, have larger boards and relatively fewer supervisory executives on the board, are less diversified, and have CEOs with on average lower tenure, relative to firms that solely rely on financial performance measures in their CEO bonus contracts.

Table 1: Summary statistics

Panel A reports descriptive statistics for variables used in the analyses. Panel B reports descriptive statistics for those variables by the type of CEO succession. Panel C reports the composition of the sample over industries. Panel D reports the Pearson correlations for the variables used in the analyses. In panel B: [a] Significance levels based on t-test. [b] Significance levels based on Wilcoxon rank-sum (Mann-Whitney) test. In panel D: Pearson correlation coefficients are reported in the upper diagonal cells. The corresponding significance levels are reported in the lower diagonal cells. ***, **, * corresponds to 1%, 5%, and 10% significance levels (two-tailed).

Panel A: descriptive statistics (full sample)

Variable	Mean	St.Dev	10%	25%	50%	75%	90%
INC_INT	0.35	0.13	0.19	0.27	0.33	0.45	0.52
D_NONFIN	0.61	0.49	0.00	0.00	1.00	1.00	1.00
NONFIN	0.21	0.18	0.00	0.00	0.25	0.33	0.50
STRAT	0.00	0.75	-0.96	-0.45	-0.01	0.57	0.86
PRODDEV	0.35	0.48	0.00	0.00	0.00	1.00	1.00
PRODLIFE	0.64	0.48	0.00	0.00	1.00	1.00	1.00
SIZE	6.94	2.28	3.78	5.40	6.94	8.19	9.89
GRWTH	1.56	0.93	0.93	1.03	1.25	1.69	2.46
RISK	0.06	0.12	0.01	0.02	0.03	0.06	0.13
TSR	0.35	0.65	-0.03	0.05	0.23	0.45	0.84
ROA	0.06	0.07	0.00	0.03	0.06	0.09	0.13
BSIZE	8.00	3.37	4.00	5.00	8.00	10.00	13.00
OUTSB	0.64	0.10	0.50	0.57	0.64	0.71	0.77
BUSYB	0.60	0.26	0.25	0.40	0.67	0.80	0.90
BLOCKH	0.36	0.22	0.11	0.19	0.35	0.53	0.69
LEV	0.62	0.22	0.31	0.49	0.62	0.73	0.94
D_LOSS	0.16	0.37	0.00	0.00	0.00	0.00	1.00
CEO_TEN	5.10	5.07	1.00	2.00	3.50	6.00	12.00
DIVERS	3.28	1.51	2.00	2.00	3.00	5.00	6.00
EQ_INC	90.27	226.19	0.00	2.00	24.50	73.00	218.00

Panel B: descriptive statistics (by D_NONFIN)

	D_NONFIN=0			D_NONFIN=1			Difference tests	
Variable	N	Mean	Median	N	Mean	Median	Mean [a]	Median [b]
INC_INT	63	0.36	0.33	101	0.33	0.33		
STRAT	63	-0.25	-0.15	101	0.15	0.07	***	***
PRODDEV	63	0.22	0.00	101	0.42	0.00	***	***
PRODLIFE	63	0.51	1.00	101	0.72	1.00	***	***
SIZE	63	6.10	6.18	101	7.47	7.41	***	***
GRWTH	63	1.72	1.41	101	1.46	1.13	*	***
RISK	63	0.08	0.03	101	0.05	0.02		
TSR	63	0.45	0.19	101	0.29	0.23		
ROA	63	0.06	0.06	101	0.07	0.06		
BSIZE	63	6.76	6.00	101	8.77	8.00	***	***
OUTSB	63	0.66	0.67	101	0.63	0.63		**
BUSYB	63	0.58	0.67	101	0.61	0.60		
BLOCKH	63	0.38	0.35	101	0.35	0.33		
LEV	63	0.66	0.65	101	0.59	0.59	**	**
D_LOSS	63	0.16	0.00	101	0.16	0.00		
CEO_TEN	63	6.41	4.00	101	4.28	3.00	**	
DIVERS	63	3.61	3.00	101	3.06	3.00	**	**
EQ_INC	63	133.9	24.00	101	63.05	17.00		

Panel C: Sample composition over industries (full sample and by D_NONFIN)

	Full sample	D_NONFIN=0	D_NONFIN=1
Mining & Construction	16 (10%)	4 (6%)	12 (12%)
Manufacturing	84 (51%)	28 (44%)	56 (55%)
Transportation, Communications, Electric, Gas and Sanitary Services	11 (7%)	1 (2%)	10 (10%)
Wholesale trade and retail trade	10 (6%)	6 (10%)	4 (4%)
Finance, Insurance, and Real Estate	8 (5%)	0 (0%)	8 (8%)
Services	35 (21%)	24 (38%)	11 (11%)
Total	164 (100%)	63 (100%)	101 (100%)

Panel C of Table 1 reports the composition of the sample over the different industries. There is a strong concentration of manufacturing firms in the full sample. Within the subsamples, it seems that manufacturing firms are somewhat more inclined to adopt nonfinancial measures in their bonus contracts. For firms that operate within the service industry the opposite seems to hold, i.e. service firms seem to more exclusively rely on financial measures in the bonus contracts. Panel D reports Pearson correlations. From these univariate analyses, the following points deserve attention. First, the relative emphasis on nonfinancial performance measures in bonus contracts is significantly and negatively associated with the incentive intensity ($p< 0.1$). Second, the relative emphasis on nonfinancial measures in bonus contracts is positively and significantly associated with: the adoption of a prospector-oriented strategy, the length of product development and product life cycles, firm size, and board size. The relative emphasis on nonfinancial measures is negatively and significantly associated with: the fraction of supervisory directors on the board, firm leverage, CEO tenure, the degree of diversification, and the extent of equity incentives.

Panel D: Pearson correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1.INC_INT	1.00	-.13*	.20***	.02	.09	.34***	.21***	-.01	.02	.00	.36***	.04	.20**	-.29***	.05	.01	-.21***	.25***	.15*
2.NONFIN		1.00	.37***	.21***	.20**	.17**	-.08	-.07	-.06	.02	.23***	-.14*	-.05	-.05	-.19**	.01	-.21***	-.22***	-.16**
3.STRAT			1.00	.06	.25***	.12	.40***	.08	-.06	.10	.27***	-.22***	-.00	-.30***	-.16**	.04	-.00	-.03	.09
4.PRODDEV				1.00	.46***	.08	-.23***	-.08	-.02	-.11	.04	.18**	.01	.06	-.15*	.03	-.11	.00	-.11
5.PRODLIFE					1.00	.22***	-.14*	-.17**	-.09	.01	.14*	.06	.07	-.13	.17**	-.06	-.23***	-.08	.14*
6.SIZE						1.00	-.22***	-.31***	-.13	-.11	.81***	-.19**	.51***	-.47***	.16**	-.09	-.20**	.12	.12
7.GRWTH							1.00	.35***	.23***	.08	.09	-.01	.07	-.14*	-.13*	.08	.18**	.07	.18**
8.RISK								1.00	.08	-.00	-.19**	.21***	-.13**	-.08	.20***	.22***	-.01	.02	-.02
9.TSR									1.00	-.14*	-.02	.13*	.00	-.05	.06	.02	.12	.03	.01
10.ROA										1.00	-.07	-.05	-.01	-.03	.00	-.31***	.06	-.03	.03
11.BSIZE											1.00	-.24***	.43***	-.47***	.16**	-.06	-.15*	.09	.09
12.OUTSB												1.00	-.22***	.15*	-.12	.04	-.02	-.13	-.06
13.BUSYB													1.00	-.38***	.07	-.04	.10	.12	.12
14.BLOCKH														1.00	-.09	.05	.04	-.06	-.25***
15.LEV															1.00	-.08	-.00	.27***	.00
16.D_LOSS																1.00	-.08	-.03	-.05
17.CEO_TEN																	1.00	-.07	.36***
18.DIVERS																		1.00	-.08
19. EQ_INC																			1.00

Third, the incentive intensity stemming from the annual bonus is positively and significantly associated with: the adoption of a prospector-oriented strategy, firm size, the presence of growth options, board size, the fraction of busy directors on the board, the degree of diversification, and the extent of equity incentives. The incentive intensity is negatively and significantly associated with the presence of blockholders and CEO tenure. So from these findings, one could conclude that firms that seek to provide stronger incentives do this by providing both stronger bonus incentives and equity incentives (i.e. holdings of stock and stock options), but that providing equity incentives can be regarded as a substitute for the inclusion of nonfinancial performance measures in CEO bonus contracts as a means to redirect managerial effort towards the long-term dimensions of effort (Dikolli, 2001). Fourth, fairly strong positive correlations exist between: the length of the product development and product life cycles, firm size and board size, and board size and the fraction of supervisory directors on the board respectively. Some strong negative correlations exist between firm size and the presence of blockholders, and between board size and the blockholders.

4.4.2 Multivariate analyses

Table 2 reports the regression estimates for equations (3) and (4).[68] The OLS and 2SLS regressions explaining the relative emphasis on nonfinancial measures in CEO

[68] The first-stage regression results that represent reduced form equations for each dependent variable (NONFIN and INC_INT) that include the original control variables as well as the proposed instruments are reported in appendix 2. So in the case of e.g. NONFIN as dependent variable, both the control variables included additional to the explanatory variable of interest (INC_INT) and the proposed instruments for INC_INT are included. The results of reduced form equations for NONFIN are consistent with prior findings. The adoption of a prospector-oriented strategy is positively associated with the relative emphasis on nonfinancial measures (Ittner et al., 1997; Said et al., 2003), and financial distress measured by the firm's leverage is negatively associated with the relative weight on nonfinancial performance measures (Said et al., 2003). Moreover and surprisingly, the presence of growth options is negatively associated with the relative weight on nonfinancial measures and the fraction of supervisory directors on the board is weakly negatively associated with the relative weight on nonfinancial measures. If one looks at the three proposed instruments for NONFIN, only the proxy for adoption of a prospector-oriented strategy is positive and significant. This confirms earlier findings that already indicated that the strength of the instruments for NONFIN is relatively weak. Overall, a similar picture applies if we look at reduced form equations for INC_INT. Regarding the proposed instruments, the fraction of supervisory directors on the board serves as complement to the provision of bonus incentives considering the positive and weakly significant association. The weak significance of some proposed instruments together with the non-significance of other instruments for INC_INT is consistent with prior findings that suggested weak instruments. Thus as noted earlier, 2SLS findings are substantiated by Moreira's where critical values of test statistics are adjusted in the presence of weak instruments (Murray, 2006; Larcker & Rusticus, 2008). Finally, three control variables are also significantly associated with INC_INT. CEO tenure is negatively associated with the provision of

bonus contracts (NONFIN) are reported in the four left columns. Dummy variables are included for years and industries and the t-statistics are based on clustered standard errors that are adjusted for heteroskedasticity and autocorrelation (Petersen, 2008). The results are fairly consistent across the OLS and 2SLS analyses.[69] For the 2SLS (OLS) model, the incentive intensity is negatively associated with the relative emphasis on nonfinancial performance measures at the $p<0.01$ ($p<0.05$) level. Thus, firms that seek to provide increased bonus incentives to their CEOs reduce the relative weight on the nonfinancial measures in the respective bonus contracts. Moreover and consistent with prior research, the adoption of a prospector-oriented strategy is positively associated with the relative emphasis on nonfinancial measures (Ittner et al, 1997; Said et al., 2003), and CEO tenure is negatively associated with the relative weight on nonfinancials (Ittner et al., 1997; Davila & Venkatachalam, 2004). To improve the robustness of these findings, some sensitivity analyses are employed (not tabulated). First, to address concerns about weak instruments, I repeated the analyses using Moreira's where critical values of test statistics are adjusted in the presence of weak instruments (Murray, 2006; Larcker & Rusticus, 2008). The results are similar with respect to the magnitude of the coefficients and the corresponding significance level (i.e. the coefficient on INC_INT (γ_1) = -0.99, $p< 0.04$). Second, the 2SLS analysis is repeated using a Tobit model that accounts for censoring of observations (Cameron & Trivedi, 2005). Here the coefficient of interest (γ_1) is slightly more negative and the significance level remains similar ($\gamma_1 = -1.67$, $p<0.04$).

Third, robust regression is employed to address the potential impact of outliers. Robust regression first excludes observations with Cook's D > 1 and subsequently

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bonus incentives (possibly due to a greater degree of power for the incumbent, risk-averse CEO or due to the firm anticipating potential horizon problems), diversification is weakly positively associated with bonus incentives (where diversification could proxy for monitoring difficulty (Bushman et al., 2004) or delegation of decision rights), and equity incentives is positively associated with bonus incentives.

[69] It must however be emphasized that similar results across OLS and 2SLS models should not automatically bolster confidence in the regression estimates (Larcker & Rusticus, 2008). First, using weak instruments in finite samples can yield bias in IV estimators in the same direction as OLS estimators, even in the case of perfectly exogenous instruments. Second, if an explanatory variable is correlated with the error term (i.e. an endogenous explanatory variable), its determinants may also be correlated with the error term in the same direction (i.e. instruments that do not satisfy the exogeneity criterion). So 2SLS estimates may be biased in the same direction as OLS estimates (Larcker & Rusticus, 2008). Note however that the use of Moreira's that specifically adjusts for weak instruments leads to similar inferences relative to the 2SLS estimates. Further, tests for over-identifying restrictions do not lead to rejection of the null of exogeneity for our proposed instruments. Re-estimating the 2SLS analyses using one single instrument each time and comparing the primary coefficients of interest across the 2SLS models does not lead to significantly different coefficients (except in one case). Re-estimating the 2SLS model excluding the suspect instruments leads to a statistically similar coefficient for INC_INT.

performs Huber iterations followed by biweight iterations. The coefficient of interest is smaller, but significance levels remains similar (γ_1 = -0.37, p<0.01). Fourth, the 2SLS analysis is repeated using bias-corrected bootstrapped confidence intervals instead of statistical inference relying on standard normal distributions (e.g. Holthausen et al., 1995; Moers, 2005).[70] A nonparametric bootstrap using 1,000 iterations with replacement is used. The coefficient for INC_INT (γ_1 = -0.99) is significant at p<0.05 level. Fifth, the analyses are repeated using D_NONFIN instead of NONFIN as the dependent variable. Note that I now examine the impact of e.g. seeking increased incentives on the decision to include nonfinancial measures in CEO bonus contracts, rather than determining the appropriate weight on nonfinancials in the respective CEO bonus contracts. The standard probit model yields a negative and significant coefficient for INC_INT (p<0.01) whereas the 2SLS probit model yields a weakly significant and negative coefficient for INC_INT (p<0.11).

The results thus suggest that firms that seek to provide increased incentives to CEOs assign a low weight to nonfinancial measures in their bonus contracts even up to a point where the bonus contract solely consists of summary financial measures.

Table 2: OLS and 2SLS estimation for NONFIN and INC_INT

This table reports the regression estimates of the following two models:

$NONFIN = \gamma_0 + \gamma_1 INC\_INT + CONTROLS + \varepsilon$,

and

$INC\_INT = \beta_0 + \beta_1 NONFIN + + CONTROLS + \varepsilon$.

Results of two regressions are reported: ordinary least squares (OLS) and two-stage least squares (2SLS). The test-statistics are reported in parentheses. Test-statistics for OLS regression are based on clustered standard error, taking into account heteroskedasticity and autocorrelation. The goodness-of-fit measure reported is the R-squared (OLS). All regressions include indicator variables that capture both year- and industry effects. ***, **, *, † correspond to 1%, 5%, 10% and 15% significance levels (two-tailed).

[70] Standard errors are computed on the basis of coefficient estimates across B bootstraps and the mean estimated coefficient across B bootstrap samples. Bias denotes the difference between the estimated coefficient for the full sample and the mean estimated coefficient across B bootstrap samples (Cameron & Trivedi, 2005). It is argued that the finite sample properties of 2SLS are somewhat unclear and therefore reliance on normal theory test statistics is questionable (e.g. Holthausen et al., 1995).

Dependent variable	NONFIN				INC_INT			
	OLS		2SLS		OLS		2SLS	
	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
INTERCEPT	0.54***	4.51	0.76***	3.58	0.13	0.71	-0.20	-0.71
INC_INT	-0.34***	-3.00	-0.99**	-2.01	--	--	--	--
NONFIN	--	--	--	--	-0.11*	-1.76	0.34	1.17
STRAT	0.11***	3.83	0.14***	3.84	--	--	--	--
PRODDEV	0.01	0.19	0.02	0.39	--	--	--	--
PRODLIFE	-0.05	-0.96	-0.07	-1.42	--	--	--	--
SIZE	0.01	0.40	0.02	1.26	0.01	0.85	0.03†	1.45
GRWTH	--	--	--	--	0.04**	2.05	0.04**	2.27
RISK	-0.03	-0.27	-0.03	-0.22	-0.05	-0.54	-0.11	-1.16
TSR	--	--	--	--	-0.00	-0.14	-0.01	-0.62
ROA	--	--	--	--	0.12	0.49	0.07	0.34
BSIZE	--	--	--	--	0.01	0.81	-0.00	-0.23
OUTSB	--	--	--	--	0.19	1.20	0.38*	1.72
BUSYB	--	--	--	--	-0.03	-0.51	0.00	0.05
BLOCKH	--	--	--	--	-0.00	-0.39	0.00	0.03
LEV	-0.08	-0.98	-0.07	-0.88	-0.01	-0.30	0.08	1.09
D_LOSS	0.01	0.31	0.02	0.44	0.02	0.60	0.01	0.29
CEO_TEN	-0.01†	-1.57	-0.01**	-2.15	-0.01***	-2.74	-0.00†	-1.53
DIVERS	-0.01	-1.06	-0.00	-0.07	0.01†	1.50	0.02*	1.69
EQ_INC	-0.00	-0.96	0.00	0.10	0.00	1.42	0.00†	1.50
Year and industry dummies	Yes		Yes		Yes		Yes	
N	164		164		164		164	
Goodness-of-fit	0.41		--		0.37		--	
F-value	5.67***		5.09***		6.21***		4.02***	

The right four columns of Table 2 report the regression estimates of OLS and 2SLS regressions explaining the degree of annual bonus incentives (INC_INT). Year and industry dummies are included and t-statistics are based on clustered standard errors adjusted for heteroskedasticity and autocorrelation (Petersen, 2008). Here the regression estimates for the OLS and 2SLS model do not coincide. Considering the OLS model, the weight on nonfinancial measures is negatively and significantly associated with the bonus incentive intensity (β_1 = -0.11, p<0.10), while the 2SLS model yields an insignificant coefficient for NONFIN. Furthermore, growth options are positively associated with the bonus incentives for both models (p<0.05), CEO tenure is negatively related with bonus incentives (p<0.01 and p<0.15 for the OLS and 2SLS model respectively), the degree of diversification is positively associated with bonus incentives (p<0.15 and p<0.10 for the OLS and 2SLS model respectively), firm size is positively associated with bonus incentives for the 2SLS model (p<0.15), the fraction of supervisory directors on the board is positively associated with bonus incentives for the 2SLS model (p<0.10), and the provision of equity incentives can be regarded as a complement to bonus incentives considering the positive association (p< 0.15). To improve the robustness of these findings, some sensitivity analyses are employed (not tabulated). First, to address any concerns about weak instruments, the analyses are repeated using Moreira's where critical values of test statistics are adjusted in the presence of weak instruments (Murray, 2006; Larcker & Rusticus, 2008). The coefficient on NONFIN is similar to the 2SLS estimate but insignificant. Second, since information on actual performance of nonfinancial performance measures is not available for those observations that put a non-zero weight on nonfinancials in the CEO bonus contracts, the 2SLS analysis is repeated with two additional control variables, i.e. the performance on ROA and TSR in the consecutive period t+1.[71] The coefficient on NONFIN however remains insignificant. Third, robust regression is employed to address the potential impact of outliers. Here the coefficient on INC_INT is both negative and significant (β_1 = -0.11, p<0.10). Fourth, the 2SLS analysis is repeated using the nonparametric bootstrap using 1,000 iterations with replacement where statistical inferences are based on bias-corrected bootstrapped confidence intervals. The coefficient for NONFIN (β_1 = -0.34) is insignificant at

[71] Here it is assumed that, to the extent that both ROA and TSR of period t do not fully incorporate the information about performance on the nonfinancial performance measures included in bonus contracts in period t, ROA and TSR for period t+1 will incorporate this information.

conventional significance levels. Fifth, the analyses are repeated using D_NONFIN as the main explanatory variable of interest instead of NONFIN. So now I examine the impact of the decision to either include or to not include nonfinancial performance measures (instead of the relative weight on nonfinancials) on the bonus incentive intensity. Consistent with the previous findings, the OLS model yields a negative and significant coefficient for D_NONFIN ($p<0.10$), whereas the 2SLS model yields an insignificant coefficient for D_NONFIN. Thus, from the latter set of analyses I conclude that OLS models suggest a negative and significant association between the relative weight on nonfinancials and the bonus incentive intensity, but that this relationship disappears when I explicitly address the potential endogeneity of NONFIN through 2SLS procedures.

Overall, the results suggest that it is not so much the decision to put more or less weight on the nonfinancial performance measures in the CEO bonus contract that affects the extent to which incentives are provided, but that firms that seek to provide increased incentives are inclined to decrease the weight on nonfinancial performance measures (and even rely solely on summary financial measures) in their CEO bonus contracts. Prior research shed some light on how firms can do this and still attain congruence in their executive compensation package. For example, Duru et al. (2002) documented that some firms shield executive compensation from the impact of strategic expenditures such as R&D and/or advertising expenditures in order to make the shielded income numbers more congruent with firm's objectives.

4.5 Conclusions and limitations

In contrast to much of the prior literature that has focused on the potential beneficial role of nonfinancial measures in contracting, in this paper I have adopted an opposite stance by focusing on the drawbacks of adding nonfinancial performance measures to summary financial measures in CEO bonus contracts. That is, nonfinancial measures most likely have a limited contribution to the congruence of the overall performance measure and may even be detrimental for the congruity of the overall measure. While employing a simultaneous equations approach that explicitly addresses the joint nature of the decisions regarding the choice of performance measures and the provision of incentives (Jensen & Meckling, 1992; Milgrom & Roberts, 1992), I document that firms that seek to provide increased incentives lower their relative

weight on nonfinancial performance measures in the respective CEO bonus contracts. If I repeat the analyses using an indicator variable indicative of whether or not firms assign a non-zero weight to nonfinancial measures instead of the relative weight assigned to nonfinancials, I find similar results (not reported). This could suggest that companies that want to provide increased incentives decrease their weight on the nonfinancial measures up to a point where the bonus contract is solely comprised of financial measures. One explanation for this finding builds on the prior literature that documents how firms adjust for items in reported earnings to ensure that executives are deterred from selecting value-decreasing activities and/or are not deterred from undertaking value-enhancing activities (e.g. Dechow et al., 1994; Gaver & Gaver, 1998; Duru et al., 2002). This could imply that firms that want to provide strong incentives, but shy away from weighting multiple financial and nonfinancial measures, adjust for items in the summary financial measure as a means to improve the congruence of the overall performance measurement system. I do not find conclusive evidence on the impact of using nonfinancial performance measures on the incentive intensity. This could be due to the limited sample size of my study. This power issue might prevent me from significantly detecting phenomena present in the population and is therefore one major limitation of this study.

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Appendix 1: Variable definitions

Variable name	Description
INC_INT	Ratio of annual bonus to the sum of salary and bonus.
D_NONFIN	Indicator variable equal to one if the firm puts non-zero weight on nonfinancial performance measures in its CEO annual bonus contract, zero otherwise.
NONFIN	The explicit weight assigned to nonfinancial performance measures in CEO annual bonus contracts.
STRAT	Firm's prospective strategy measured as a composite of: i) the ratio of research and development to sales; ii) the market-to-book ratio; and iii) the ratio of the number of employees to sales.
PRODDEV	Indicator variable equal to one if the firm is classified as having a long product development cycle, zero otherwise.
PRODLIFE	Indicator variable equal to one if the firm is classified as having a long product life cycle, zero otherwise.
SIZE	Natural logarithm of book value of total assets.
GRWTH	The ratio of the market value of equity divided by the book value of equity.
RISK	Standard deviation of return on assets of the prior five years.
TSR	Total shareholder return.
ROA	Net income divided by the book value of total assets.
BSIZE	The total number of directors on both the managing and supervisory board.

OUTSB	The proportion of total directors that serve on the supervisory board.
BUSYB	The proportion of the total directors that serve on four or more boards.
BLOCKH	The proportion of total outstanding shares that are owned by shareholders owning more than 5% of the outstanding shares.
LEV	The ratio of total liabilities to the book value of total assets.
D_LOSS	Indicator variable equal to one if the firm has net income < 0 in the prior year, zero otherwise.
CEO_TEN	The number of years that the CEO has retained the CEO position.
DIVERS	The number of reported segments in the annual report.
EQ_INC	The change in the value of the CEO's portfolio of stock and stock options following a 1% change in stock price.

Appendix 2: Reduced form equations for NONFIN and INC_INT (1st stage results)

Dependent variable:	NONFIN		INC_INT	
	Coeff.	t-stat.	Coeff.	t-stat.
INTERCEPT	0.78***	4.17	0.06	0.36
STRAT	0.09***	2.83	0.03	1.35
PRODDEV	-0.01	-0.11	0.02	0.50
PRODLIFE	-0.04	-0.87	-0.02	-0.73
SIZE	-0.02	-0.76	0.02	1.24
GRWTH	-0.05**	-2.19	0.03	1.38
RISK	0.09	0.59	-0.08	-0.91
TSR	0.03	1.22	0.00	0.00
ROA	0.08	0.42	0.10	0.45
BSIZE	0.01	1.21	0.00	0.23
OUTSB	-0.34†	-1.63	0.26†	1.62
BUSYB	-0.03	-0.48	-0.01	-0.09
BLOCKH	-0.00	-0.17	-0.00	-0.01
LEV	-0.15**	-2.00	0.03	0.60
D_LOSS	0.02	0.45	0.02	0.41
CEO_TEN	-0.01	-1.10	-0.01**	-2.62
DIVERS	-0.01	-1.26	0.02†	1.54
EQ_INC	-0.00	-0.81	0.00*	1.68
Year and industry dummies	Yes		Yes	
N	164		164	
Goodness-of-fit	0.43		0.37	
F-value	6.62***		6.59***	

***. **, *, † correspond to 1%, 5%, 10% and 15% significance levels (two-tailed).